FISHERY MANAGEMENT INVESTIGATIONS

FEDERAL AID IN FISH RESTORATIONS
1993 JOB PERFORMANCE REPORT
PROGRAM F-71-R-18

Steven M Huffaker, Director

REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS
UPPER SNAKE REGION (Subprojects I-A, II-A, III-A, IV-A

PROJECT I.	**SURVEYS and INVENTORIES**
Job a.	**Upper Snake Region Mountain Lakes Investigations**
Job b	**Upper Snake Region Lowland Lakes Investigations**
Job c.	**Upper Snake Region Rivers and Streams Investigations**
PROJECT II.	**TECHNICAL GUIDANCE**
PROJECT III.	**HABITAT MANAGEMENT**
PROJECT IV.	**POPULATION MANAGEMENT**

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State of: Idaho | Program: Fisheries Management F-71-R-18

Project I: Surveys and Inventories | Subproject I-G: Upper Snake Region

Job: a | Title: Mountain Lakes Investigations

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

We did not conduct mountain lake investigations in the Upper Snake Region during 1993. Supplemental stocking of Arctic grayling *Thymallus arcticus,* rainbow trout *Oncorhynchus mykiss* and cutthroat trout *Oncorhynchus clarki* was conducted in 10 lakes in accordance with the three-year rotation schedule. Helicopter scheduling problems caused us to miss four lakes; this will be added to the 1994 stocking schedule.

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METHODS

We attempted to stock 14 mountain lakes in the Lost River Range and Copper Basin. All stocking was done by helicopter, hovering above open water. Trout *Oncorhynchus spp.* fry were poured from oxygenated plastic bags to the target water.

RESULTS AND DISCUSSION

Four of the 14 mountain lakes scheduled for stocking in 1993 (Lower Swauger, Bobber, Shadow #1, Shadow #2) were frozen and consequently were not stocked in this rotation. The unavailability of the Challis National Forest fire helicopter delayed our stocking three weeks later than prior stockings. The ten remaining lakes were successfully stocked without difficulty (Table 1).

The four lakes missed in 1993 will be added to our 1994 rotation, then moved back to their previous rotation to be stocked as normally scheduled.

RECOMMENDATIONS

1. Add Lower Swauger, Bobber, Shadow #1 and Shadow #2 lakes to the 1994 rotation, and then reschedule in the "A" rotation.

2. Work with the Challis National Forest to evaluate the potential for establishing a golden trout *O. aguabonita* brood stock in the Copper Basin lake chain.

3. Work with the Challis National Forest to conduct an angler use survey.

Table 1. High mountain lake locations and numbers of Arctic grayling *Thymallus arcticus,* rainbow trout *Oncorhynchus mykiss*, and cutthroat trout *Oncorhynchus clarki* trout fry stocked on October 18, 1993.

Lake	Species	Number	Location
Bear Creek Lake	Rainbow	1,000	8N 5E 29
Copper Lake	Cutthroat	1,500	9N 24E 23
Upper Swauger Lake	Cutthroat	3,000	9N 24E 26
Big Creek Lake	Rainbow	500	8N 25E 7
Iron Bog Lake #1	Cutthroat	2,500	4N 22E 28
Fish Pole Lake	Cutthroat	2,500	4N 22E 28
Corral Lake	Cutthroat	2,000	6N 23E 8
Packsaddle Lake	Cutthroat	2,000	5N 43E 12
Divide Creek Lake	Cutthroat	1,000	13N 51E 33
Horseshoe Lake	Grayling	2,000	10N 45E 26

1993 ANNUAL PERFORMANCE REPORT

State of: Idaho | Program: Fisheries Management F-71-R-18

Project I: Surveys and Inventories | Subproject I-G: Upper Snake Region

Job: b | Title: Lowland Lakes Investigations

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

Annual experimental gillnetting on Henrys Lake documented, for the first time, the presence of Utah chub *Gila atraria* in the lake. Although several year classes appear to be present in the lake, we do not know how long or to what extent Utah chub have been established there.

Henrys Lake supported approximately 144,000 hours of effort in 1993, with a season catch rate of 0.64 trout per hour. Approximately 26,710 trout were harvested from Henrys Lake in 1993.

A bathymetric map was constructed for Henrys Lake.

Island Park Reservoir was renovated with rotenone in fall 1992. Restocking with game fish began in fall 1992 and continued throughout 1993. Spring 1993 gill net samples from Island Park Reservoir were comprised of 52% Utah chub and Utah suckers *Catostomus ardens*. Hatchery and wild rainbow trout *Oncorhynchus mykiss* comprised 32% of the catch, mountain whitefish *Prosopium williamsoni* 8%, and kokanee *O. nerka* 6%. Utah chub and Utah sucker gillnetting CPUE declined 87 percent compared to 1992 samples.

We evaluated Palisades Reservoir stocking strategies for Yellowstone finespotted cutthroat *O. clarki bouveri* from Jackson National Fish Hatchery. We documented poor seasonal catch rates from October 1992 to October 1993. We recommend considering alternate species for Palisades Reservoir.

In Ririe Reservoir, hatchery catchable rainbow trout, hatchery fingerling rainbow trout, yellow perch *Perca flavescens*, and kokanee salmon *O. nerka kennerlyi* provided 32 percent, 24 percent, 23 percent, and 16 percent, respectively, of the 1993 catch. Evaluation of extra large hatchery catchable rainbow trout (12-14") documented excellent return to the creel, cost efficiency, and angler satisfaction. Bass tournament CPUE data suggests smallmouth bass *Micropterus dolomieu* are providing modest but stable angling opportunities in Ririe Reservoir. Catch rates were highest in the fall at 1.4 bass/hour. Catch in gill net and trap net surveys were dominated by Utah chub (83 percent) and Utah suckers (16 percent). Lake trout *Salvelinus namaycush* and splake *S. namaycush* x *S. fontinalis* were introduced on a trial basis to be evaluated for sport fishing and potential Utah chub management benefits.

Spring gillnetting in Mud Lake following the 1992-1993 winterkill yielded no game or nongame fish. The winterkill apparently resulted in a near complete eradication of lake dwelling

fish. Extensive restocking of Mud Lake the spring of 1993 included 15,900 largemouth bass *Micropterus salmoides*, 3,250 yellow perch, 5,000 channel catfish *Ictalurus punctatus*, 360 bluegill *Lepomis microchirus*, 24,000 Lahontan cutthroat *O. clarki henshawi*, and 1,400 tiger muskies *Esox lucius* x *E. masquinongy*.

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INTRODUCTION AND METHODS

Henrys Lake

Henrys Lake Hatchery is a combination federally- and license-funded resident station located in the northern Island Park area of Fremont County in east central Idaho. The hatchery was established in 1924 as an egg-taking facility to offset the potential loss of spawning habitat due to the construction of a dam at the lake outlet in 1922.

The hatchery continues to function as an egg-taking station and ships eyed eggs of cutthroat trout *Oncorhynchus clarki*, rainbow trout *O. mykiss* x cutthroat trout hybrids and brook trout *Salvelinus fontinalis* to statewide hatcheries. The hatchery was operated during 1992-1993 to collect eggs for statewide fish plants and to enhance the Henrys Lake fishery. The hatchery was reclassified as a management station on August 1, 1993, with the objective of collecting fundamental fisheries management data on Henrys Lake.

Spawning

During October 1992, a trap net was used in conjunction with the fish ladder to capture 605 brook trout (336 males and 269 females). Due to the lowest lake level since 1938, no fish entered the fish ladder. All fish were collected by trapping and transported to the spawning facility. There was no effort made to distinguish between Temiscamie and naturalized brook trout because fisheries managers had determined in 1991 that there was no significant difference in performance between the two strains of brook trout. In an effort to infuse new genetic stock into the naturalized fish, the two were crossed at random for egg production.

Brook trout were spawned during the fall of 1993. Henrys Lake level was nearly full during early October when the ladder was installed. Morpholine was used to imprint brook trout planted in previous years, and a drip system was initiated in the spawning facility on the 14th of October. Due to the success of fish ascending the fish ladder, it was unnecessary to use the trap net. A total of 926 brook trout were counted in the ladder (413 males and 513 females) (Figure 1). Temiscamie and naturalized brook trout were spawned together randomly for egg production.

Annual Creel Survey

The trout fishery was monitored from May 23 to October 31, 1992 as part of a continuing evaluation of management practices.

During 1993, the trout fishery was monitored during from May 29 to October 31.

This is an annual, stratified, randomized season-long creel survey described by Gamblin (1995).

Lake Mapping

A cooperative project with the Idaho National Engineering Laboratory was completed to compile a bathymetric map of Henrys Lake using geographic information system software, global positioning system satellite hardware, and a sonar graph recorder.

Fish Population Surveys

Gill net surveys were conducted on Henrys Lake on June 18 and 25, 1993. Three experimental gill nets (two floating and one sinking) were fished overnight on June 18, and four experimental gill nets (two floating, two sinking) were fished overnight on June 25.

Island Park Reservoir

Post Renovation Restocking

Efforts to restock Island Park Reservoir after the September 1992 renovation project began in fall 1992 and continued throughout 1993.

Fish Population Surveys

Gill net surveys were conducted on Island Park Reservoir on June 18 and 25, 1993. Three experimental gill nets (two floating, 1 sinking) were fished overnight on June 18, and four experimental gill nets (two floating, two sinking) were fished overnight on June 25.

Palisades Reservoir

Creel Survey

The Palisades Reservoir fishery management program has not met statewide reservoir management goals (catch rate of 0.6 fish/hour) since 1964. Since the early 1960s managers have maintained that a combination of severe reservoir pool drawdowns and parasitic infestations of the nematode *Philonema agubernaculum* are the principle limitations to the finespotted cutthroat trout *O. clarki bouveri* that Palisades Reservoir is managed for. Management recommendations to relieve the situation have focused consistently on minimizing the susceptibility of cutthroat trout to *Philonema* by stocking at a larger size (>175 mm) and increasing the growth and survival of the hatchery cutthroat trout by coordinating their release into Palisades Reservoir with spring population blooms of *Daphnia* spp, their primary forage item.

In September 1992, we initiated a year-long randomized, stratified creel survey to evaluate the success of stocking Jackson National Fish Hatchery finespotted cutthroat trout approximately six inches in length to coincide with warming spring water temperatures and population expansion of *Daphnia* spp.

The creel survey was designed after the survey described by Moore et al. (1981) and was terminated in September 1993.

Ririe Reservoir

Creel Survey

A full-scale stratified creel survey was conducted May 29 (opening day) through September 6, 1993. Sampling was done using a roving creel survey technique, and sampling effort was uniform with respect to the four lake sections. Anglers contacted were queried for length of time fished, species, number and size of fish caught and kept or released, and resident/nonresident status. A major reason for doing this creel survey was to evaluate the return of fingerling and super catchable hatchery rainbow trout to the creel.

Catchable Trout Evaluation

Several sizes of hatchery rainbow trout were stocked in Ririe Reservoir at various times for evaluation of their contribution to the fishery in 1993. Fingerlings (210, 870 fish @ 115-215 mm TL) were stocked in spring 1992 and super catchables ("Mackay Magnums," 12,019 fish @ 305-356 mm TL) were stocked in spring and summer 1993.

All rainbow trout in the 1993 creel were inspected by the survey clerk and identified as products of either fingerling or super catchable plants, or wild reproduced fish. Cost per fish in the creel (of each type of hatchery product) was then determined using the following formula:

COST per FISH IN THE CREEL (caught) =

$$\frac{\text{WT. of FISH STOCKED (Lbs.) X COST per Lb. delivered (\$2.05)}^{a}}{\text{ESTIMATED TOTAL \# FISH CAUGHT during entire season}}$$

[a] - Bill Doerr (IDFG) personal communication

Fish Population Surveys

We conducted a lowland lakes survey on Ririe Reservoir on July 1, 1993. Three experimental gill nets (two floating, one sinking) were fished for three hours from approximately 2100 to 2400 hrs. Two trap nets were fished overnight. This effort completed the Ririe Reservoir Lowland Lake Survey that was begun in 1992.

Bass Tournaments

We attended the weigh-in sessions of the largest bass tournament of the year held on Ririe Reservoir (July 17-18). Lengths, weights, and scales for aging purposes were collected from all smallmouth bass *Micropterus dolomieu* weighed in. In addition, total effort and catch-per-unit-effort (CPUE) for all bass and for legal bass only were calculated.

Fish Introductions

Seven thousand 178 mm splake (lake trout *Salvelinus namaycush* x brook trout *S. fontinalis* hybrids) and 7,000 7" lake trout were introduced to Ririe Reservoir in October 1993. These piscivorous salmonids will be evaluated in 1994 and 1995 for use of Utah chub *Gila atraria* as forage and for their contribution to the sport fishery.

Mud Lake

Winterkill

In about January 1993, anoxic conditions in Mud Lake culminated in a severe, if not total, fish winterkill. Three floating gill nets were fished overnight on May 14 to assess the completeness of the fish kill. A visual census of the lake's shallows was attempted by a trained observer as well as by boat electrofishing.

Fish Population Surveys

In addition to the post winterkill gillnetting effort in May, two experimental gill nets (one floating, one sinking) were fished overnight on September 21, mainly to assess forage availability prior to stocking advanced fingerling tiger muskie *Esox masquinongy* x *E. lucius* to be purchased from a private hatchery operation.

Post Winterkill Restocking

An extensive effort was undertaken throughout 1993 to restock Mud Lake with game fish after it winterkilled. Private and state hatcheries as well as in-state public fishing waters were used as sources for fingerling, advanced fingerling, catchable, and brood stock of warm, cool, and cold water fish.

RESULTS AND DISCUSSION

Henrys Lake

Spawning

In 1992, brook trout green eggs totaled 510,999 taken from 203 females for an average fecundity of 2,517 eggs per female. Eyed eggs totaled 314,689 for an eye-up percentage of 61.6% (Table 1). The mean total length for brook trout males was 423 mm, an increase of 101 mm from the previous year, and female total length averaged 421 mm, up 6 mm from the previous year's average (Figure 2).

During 1993, 583,388 brook trout green eggs were taken from 322 females for a total average fecundity of 1,811 eggs using air spawning. Eyed eggs totaled 396,914 for an eye-up survival rate of 68%.

Male brook trout averaged 376 mm total length (N=342), and female brook trout averaged 402 mm total length (N=383) (Figure 3). These averages were down 47 and 19 mm, respectively, from the previous year; however, this could be a reflection of selection differences between using the trap net and ladder exclusively in subsequent years.

The 1993 run of cutthroat and hybrids consisted of 4,432 cutthroat; 2,542 males and 1,890 females (Figure 4). Hybrid trout numbered 1,600 including 947 males and 653 females (Figure 5). The total run numbered 6,032 fish. The fish ladder was placed in operation on February 23, 1993, and spawning began March 1. Average total length of male and female cutthroat sampled in the 1993 spawning run was 457 mm (n=582), down 25 mm from 1992 (Figure 6). Hybrid trout averaged 535 mm (n=474), up 16 mm from 1992 (Figure 7).

Cutthroat eggs totaled 3,869,768 from 1,295 females producing an average fecundity of 2,988 eggs per female. Green eggs yielded 2,875,576 eyed eggs for an eye-up survival of 74% (Table 1).

A total of 1,557,427 cutthroat X rainbow eggs were collected from 589 females for an average fecundity of 2,644 eggs per female. Eyed hybrid eggs totaled 1,121,347 for an eye-up survival of 72 percent (Table 1).

Table 1. Egg summary, Henrys Lake Hatchery, 1992-1993.

Species	Green Eggs	Eyed Eggs	Percent Eye-Up
Cutthroat, 1993	3,869,768	2,875,576	74.3
Hybrid trout, 1993	1,557,427	1,121,347	72.0
Brook trout, 1992	510,999	314,689	61.6
Brook trout, 1993	583,388	396,914	68.0
Total	6,521,582	4,708,526	72.2

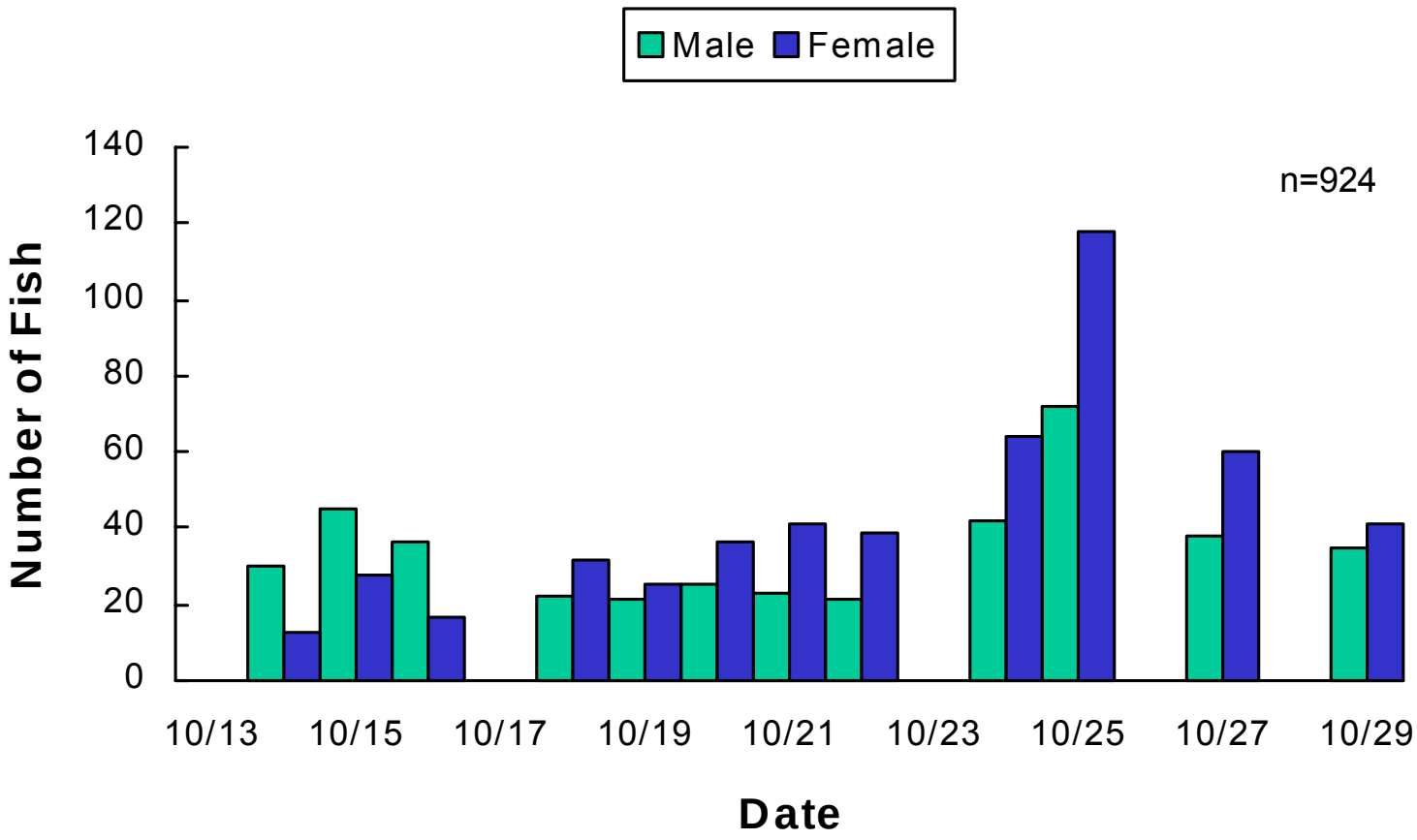


Figure 1. Run timing for male and female brook trout at Henrys Lake Hatchery, 1993.

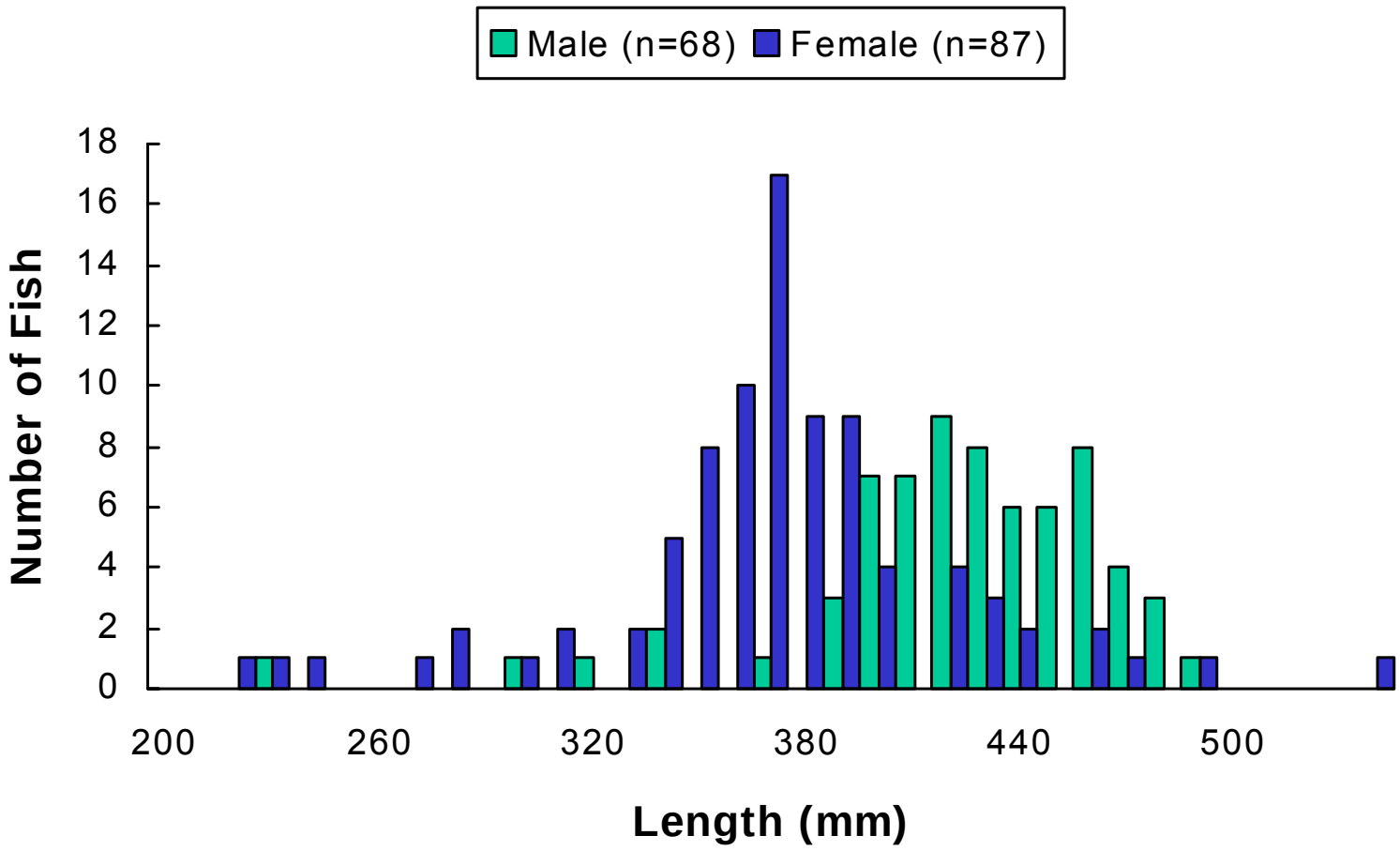


Figure 2. Length frequencies of male and female brook trout in the Henrys Lake Hatchery spawning run, 1992.

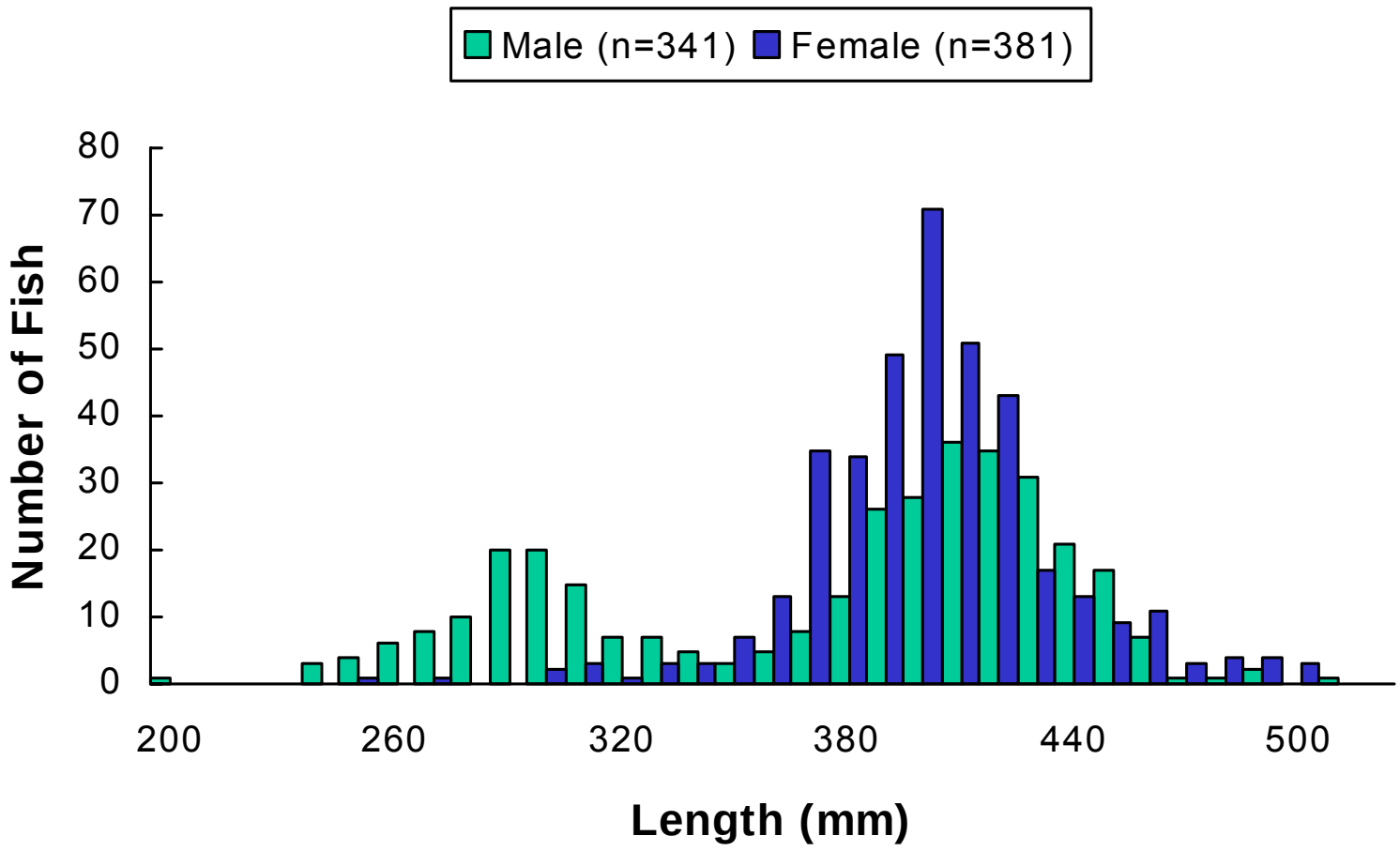


Figure 3. Length frequencies of male and female brook trout in the Henrys Lake Hatchery spawning run, 1993.

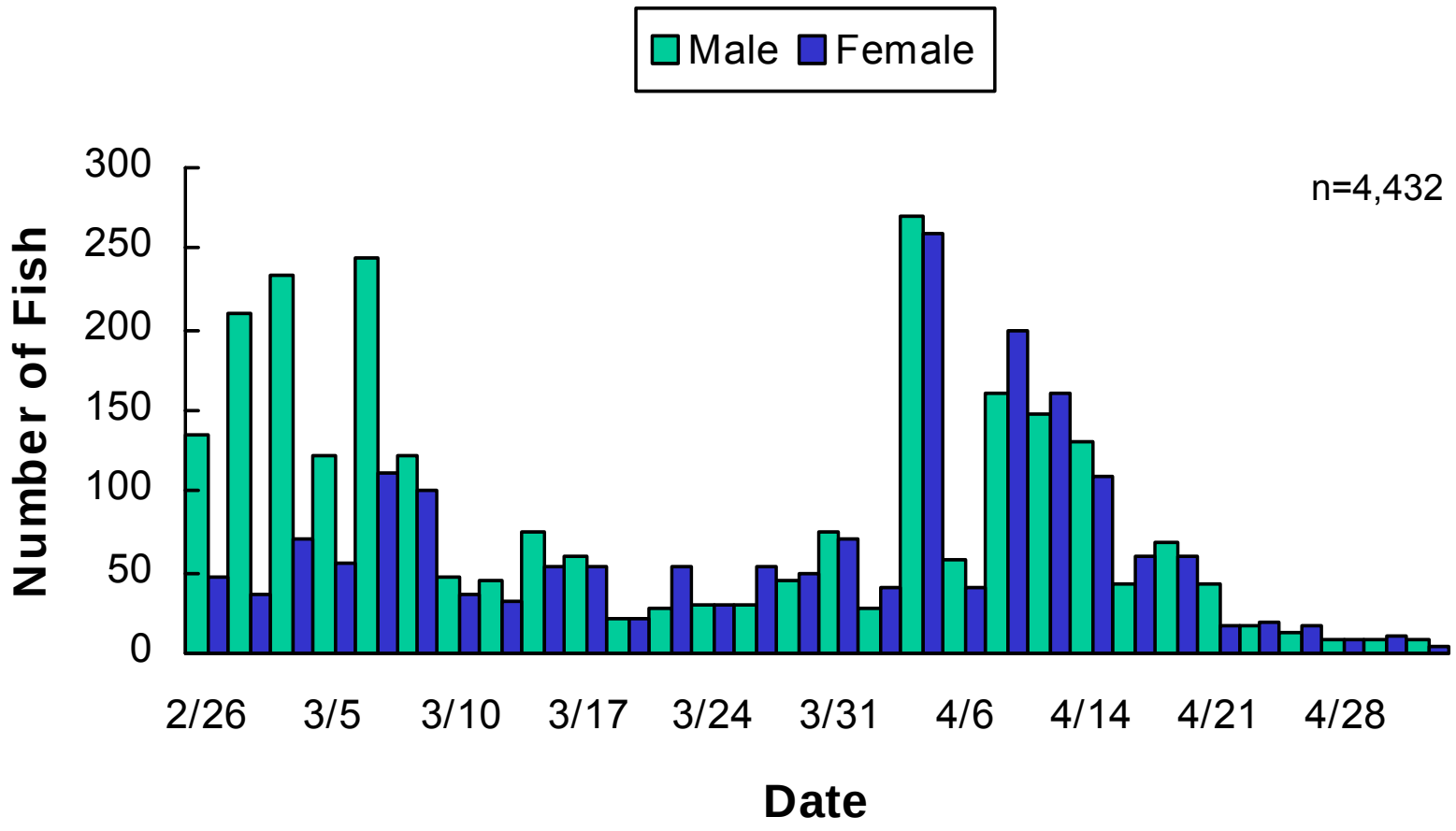


Figure 4. Run timing for male and female cutthroat trout at Henrys Lake Hatchery, 1993.

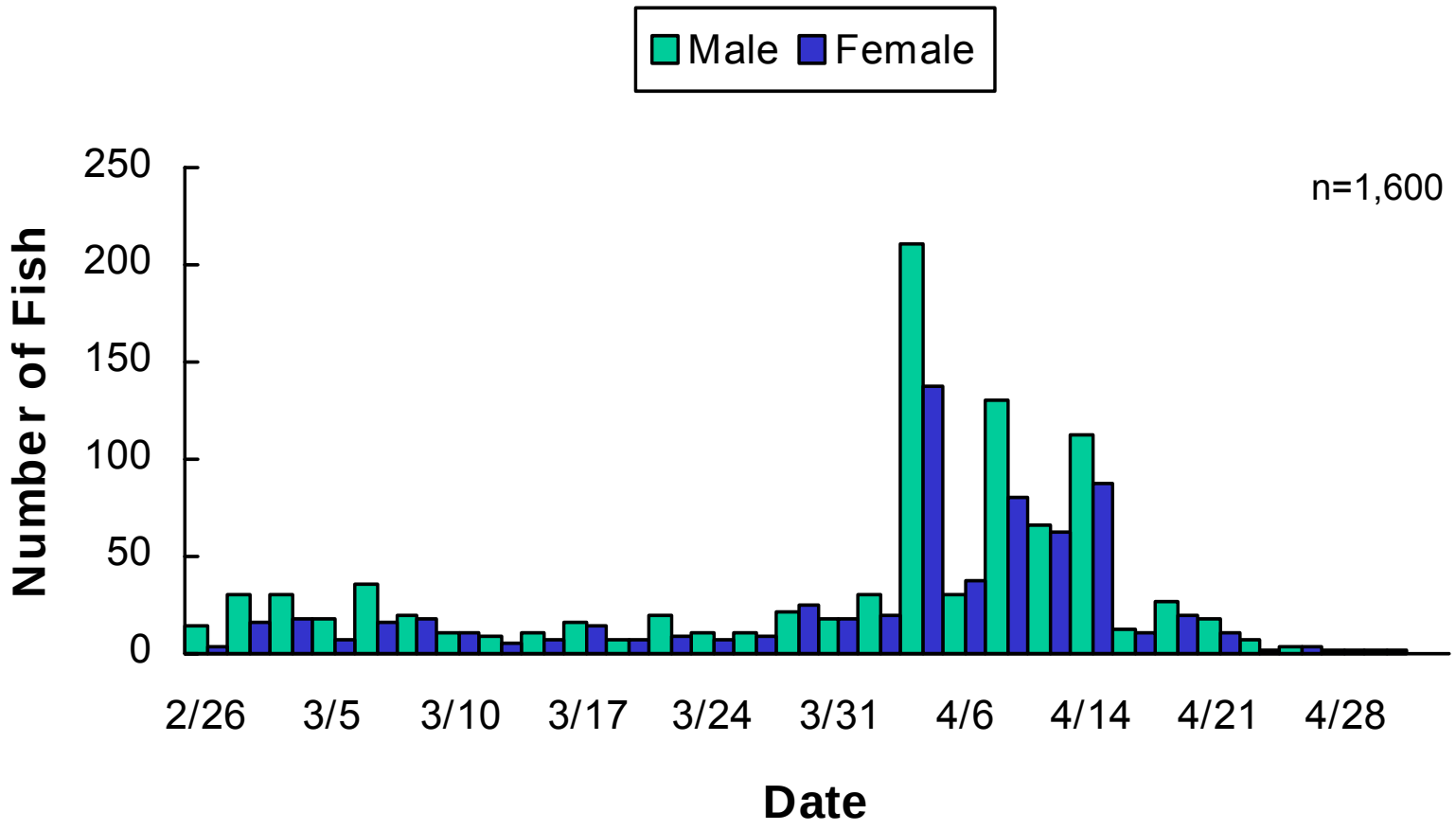


Figure 5. Run timing for male and female hybrid trout at Henrys Lake Hatchery, 1993.

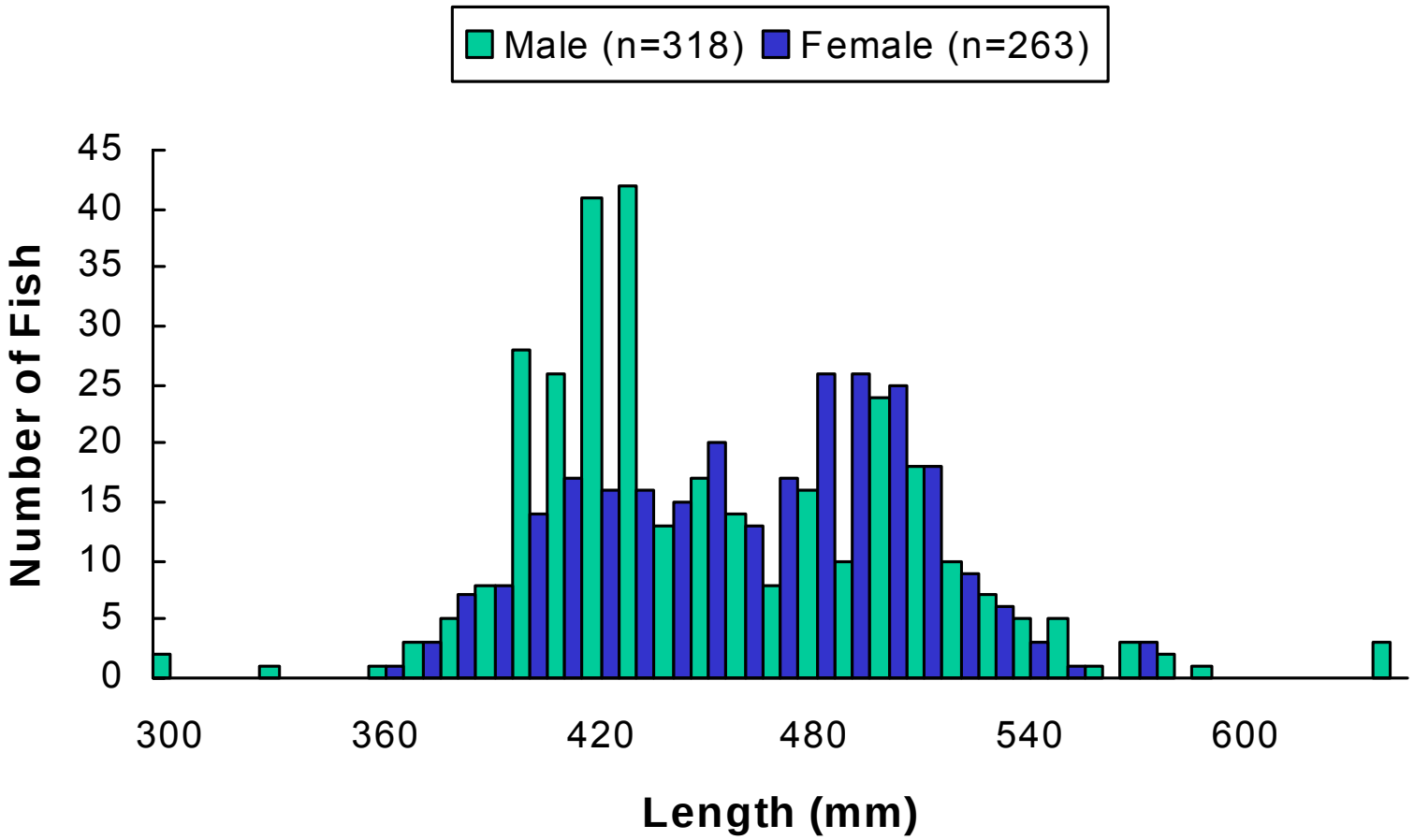


Figure 6. Length frequencies of male and female cutthroat trout in the Henrys Lake Hatchery spawning run, 1993.

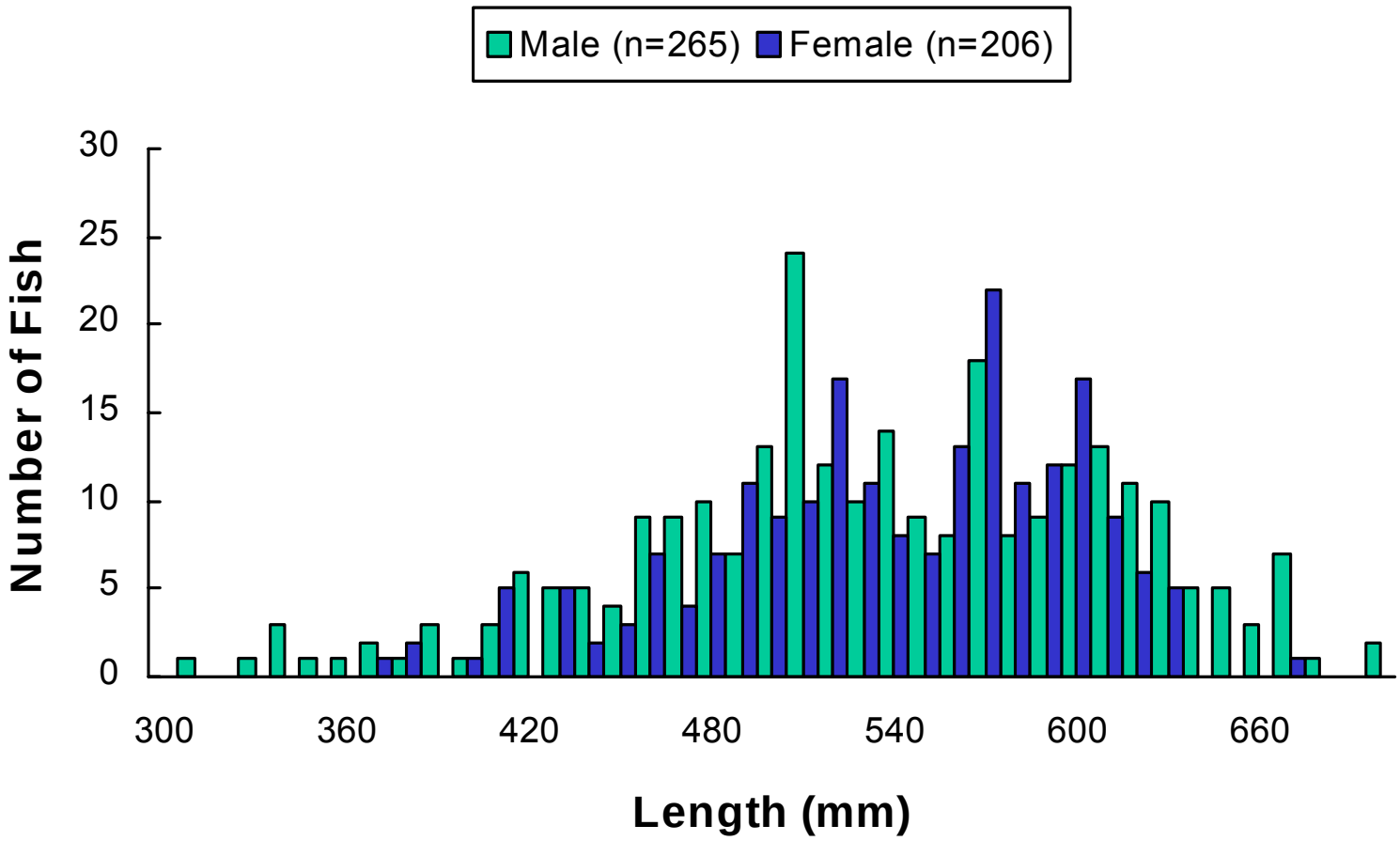


Figure 7. Length frequencies of male and female hybrid trout in the Henrys Lake Hatchery spawning run, 1993.

Lake Mapping

The bathymetric map was completed and verified by independent depth readings in 1993. The completed map (Figure 8) will have a variety of potential management applications for Henrys Lake including vegetation mapping and repeated measurements, aiding in conducting experimental purse seine collections, radio telemetry of Henrys Lake trout, or precise location of standardized gill net or trap net sets.

Fish Population Surveys

Gillnetting on Henrys Lake provided one of the real surprises of 1993. The June 18 effort, while yielding only 63 fish in 3 net nights, resulted in a catch made up of 49% Utah chub, a species never before confirmed or even reported in Henrys Lake. The remainder of the fish caught were hybrid, cutthroat, and brook trout in order of decreasing abundance.

The June 25 and July 8 efforts, with four gill net nights of effort and three gill net and two trap net nights of effort, respectively, only captured a single additional chub (Figure 9).

While these results probably do not warrant immediate drastic action, the Henrys Lake chub population does call for future monitoring for expansion and potential negative effects on trout populations in the lake.

Length frequency distributions for all species sampled are presented in Appendix A.

Creel Survey

1992-Estimated angling effort was 115,526 hours, and the total catch rate for all trout species was 0.45 trout per hour which falls below the management goal of 0.7 fish per hour (Table 2). Species composition of the harvest was 38% cutthroat, down 10% from the previous year. Hybrid trout comprised 52% of the catch, up 3% from the previous year and 10% brook trout, up 7% from the previous year. The management objectives are 65% cutthroat, 20% hybrids, and 15% brook trout.

The total harvest during 1992 was approximately 12,192 trout, down 6,692 from the previous year, for a harvest catch rate of 0.11 fish per hour. The percentage of fish released was 72% (Table 2).

The mean total length of cutthroat trout measured in the creel was 452 mm with an estimated 27% of the catch being trophy size (greater than 510 mm) (Figure 10). The mean total length of hybrid trout was 474 mm with 42% of the catch being trophy size (Figure 11). Brook trout averaged 417 mm with 18% of the catch greater than 450 mm (Figure 12).

Figure 8. Bathymetric map of Henrys Lake, October 9, 1992.

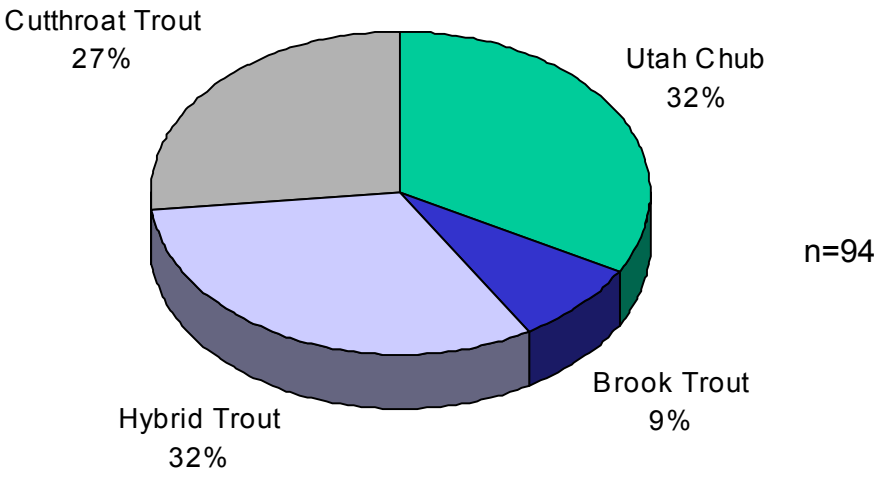


Figure 9. Species composition in experimental gillnet catches at Henrys Lake, June 18-July 8, 1993.

Table 2. 1992 creel survey summary.

Henrys Lake May – October, 1992				
Effort (total hours)	Harvest	Harvest rate	Catch rate	Percent released
115,526	12,192	0.106 f/h	0.45 f/h	72%

		Catch composition (%)		
May - October		Cutthroat	Hybrid	Brook
		38.32	51.89	9.69

	Mean Size	% >20”	No. >20”	Total harvest May - October
Cutthroat	452 mm	27%	21	3,722
Hybrid	474 mm	42%	40	6,872
Brook	417 mm	% >18”	No. >18”	1,192
		22%	6	

	Effort	Released	Harvested	Total catch
Interval 1 (5/23 - 5/25)	23,107	5,130	3,143	8,249
Interval 2 (5/26 - 6/22)	20,242	8,986	3,813	12,273
Interval 3 (6/23 - 7/20)	15,422	11,728	1,874	13,603
Interval 4 (7/21 - 8/17)	8,027	2,510	828	3,344
Interval 5 (8/18 - 9/14)	3,919	2,101	414	2,481
Interval 6 (9/15 - 10/12)	11,652	3,830	1,464	5,282
Interval 7 (10/13 - 10/31)	11,485	6,509	656	7,166

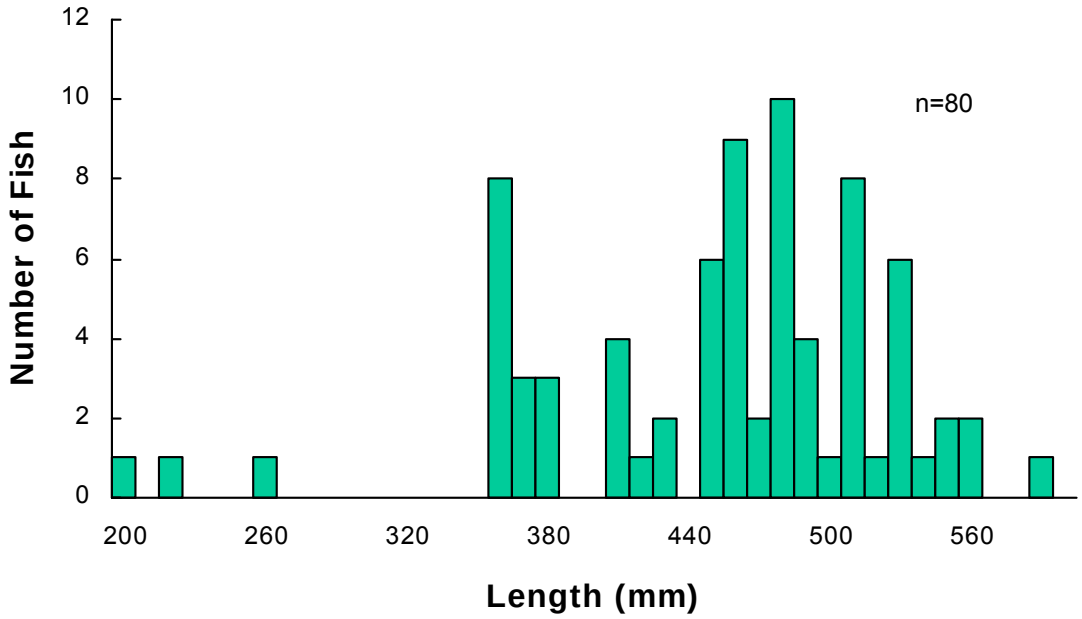


Figure 10. Length frequency of cutthroat trout observed in the harvest, Henrys Lake, 1992.

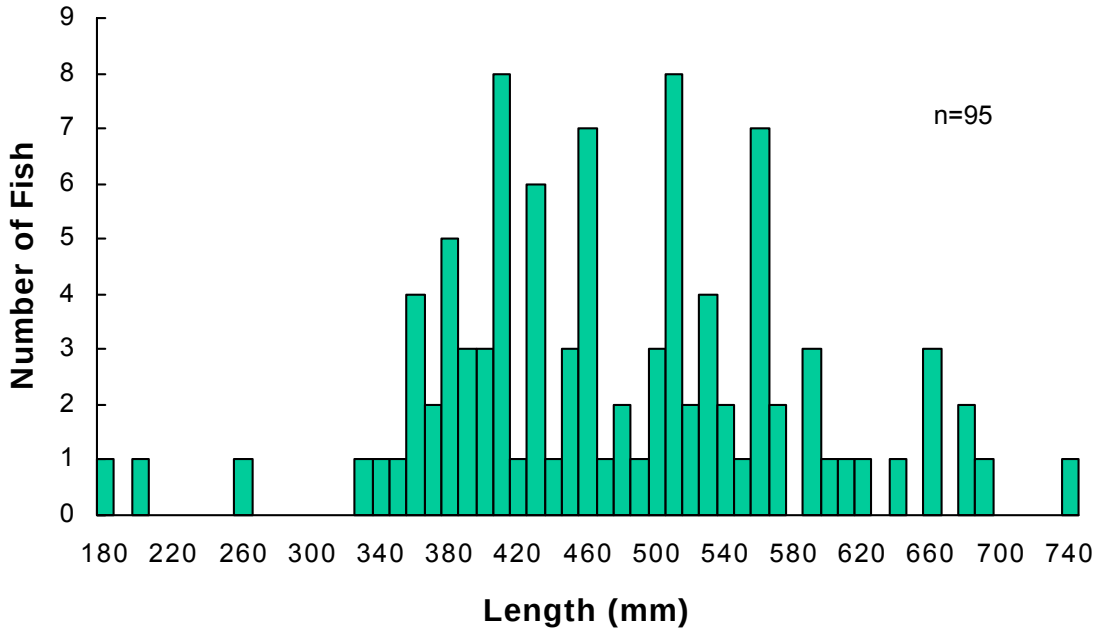


Figure 11. Length frequency of hybrid trout observed in the harvest, Henrys Lake, 1992.

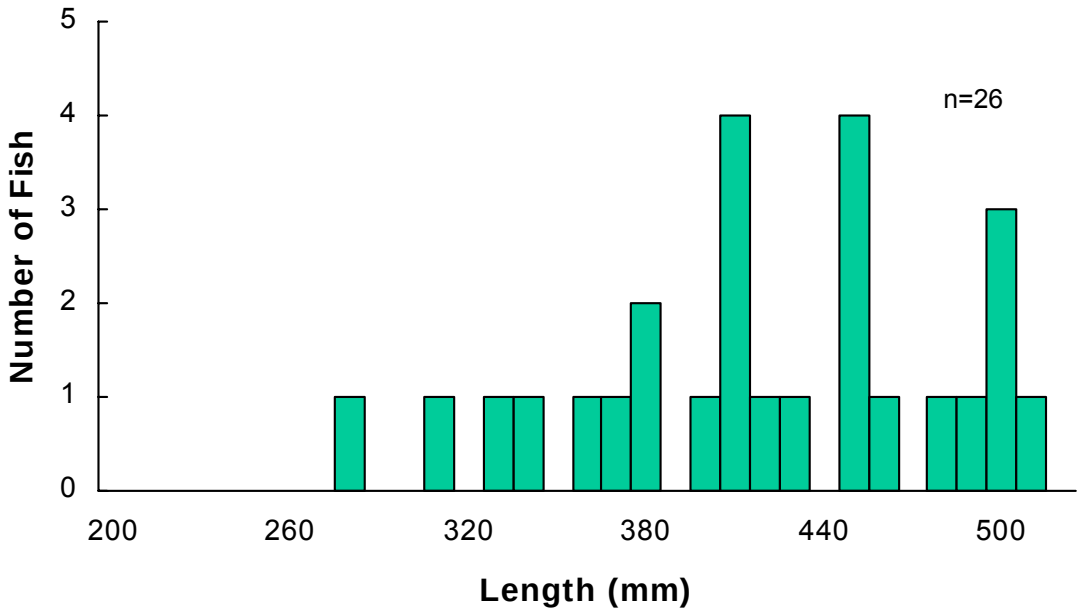


Figure 12. Length frequency of brook trout observed in the harvest, Henrys Lake, 1992.

1993-Estimated angling effort was 144,267 hours, and the total catch rate for all trout species was 0.64 trout per hour which is approaching the management goal of 0.7 fish per hour. Species composition of the harvest was 76% cutthroat, 21% hybrid trout, and 3% brook trout (Table 3).

The total harvest during 1993 was approximately 26,710 trout for a harvest catch rate of 0.8 fish per hour. The percentage of fish released was 71% (Table 3).

The mean total length of cutthroat trout measured in the creel was 410 mm with an estimated 7.2% of the catch being trophy size (>510 mm) (Figure 13). The mean total length of hybrid trout was 485 mm with 35% of the catch being trophy size (Figure 14). Brook trout averaged 382 mm with 23% of the catch being trophy size (>450 mm) (Figure 15).

Stocking

1992-Approximately 943,080 cutthroat trout, 203,125 hybrid trout and 144,000 brook trout were stocked into Henrys Lake in the fall of 1992 as fingerlings. An additional 100,000 unfed brook trout swim-up fry were planted into lake tributaries during March 1993. Also, 170 adult cutthroat surplus spawners were transferred to Howard Creek in March 1993.

1993-Approximately 1,000,000 cutthroat, 250,000 hybrid trout and 90,000 brook trout were stocked into Henrys Lake and its tributaries during September and October of 1993. In May of 1993 an additional 60,000 fed brook trout fry were planted into tributaries of Henrys Lake, and in March 60,000 unfed brook trout swim-up fry were planted into tributaries. In July of 1993 approximately 450,000 unfed cutthroat fry were planted into Henrys Lake tributaries.

Island Park Reservoir

Post Renovation Restocking

A massive restocking effort was undertaken to take advantage of the renovated condition of Island Park Reservoir. In fall 1992 and all of 1993, the main emphasis of restocking was to flood the habitat with desirable planktivores (rainbow trout, kokanee *O. nerka kennerlyi*). This flooding would take advantage of a less competitive atmosphere in the reservoir and possibly keep Utah chub and Utah sucker from rebounding by intense numerical competition for food and space. To date only Lahontan cutthroat trout *O. clarki henshawi* have been stocked as a possible predator, and although more obligate piscivores have been considered such as splake or lake trout, no introductions of these species has been made. A complete listing of fish species and numbers stocked so far is presented in Appendix B.

Table 3. 1993 creel survey summary.

Henrys Lake May – October 1993				
Effort (total hours)	Harvest	Harvest rate	Catch rate	Percent released
144,267	26,710	0.18 f/h	0.64 f/h	71%

	Catch composition (%)		
May - October	Cutthroat	Hybrid	Brook
	75.92	20.83	3.25

	Mean size	% >20”	No. >20”	Total harvest May - October
Cutthroat	410 mm	7.2%	26	21,905
Hybrid	485 mm	35%	42	3,891
Brook	382 mm	% >18”	No. >18”	1,321
		23%	6	
				Total 27,117[a]

	Effort	Released	Harvested	Total catch
Interval 1 (5/23 - 5/25)	26,962	8,304	4,449	12,753
Interval 2 (5/26 - 6/22)	41,169	14,704	9,112	12,273
Interval 3 (6/23 - 7/20)	24,249	10,401	4,296	14,697
Interval 4 (7/21 - 8/17)	18,995	7,601	3,784	11,385
Interval 5 (8/18 - 9/14)	8,444	2,818	1,176	3,994
Interval 6 (9/15 - 10/12)	14,573	16,540	1,428	17,968
Interval 7 (10/13 - 10/31)	9,875	5,308	2,465	7,853
Totals	144,267	65,756	26,710[a]	92,466

[a] Difference is software rounding error.

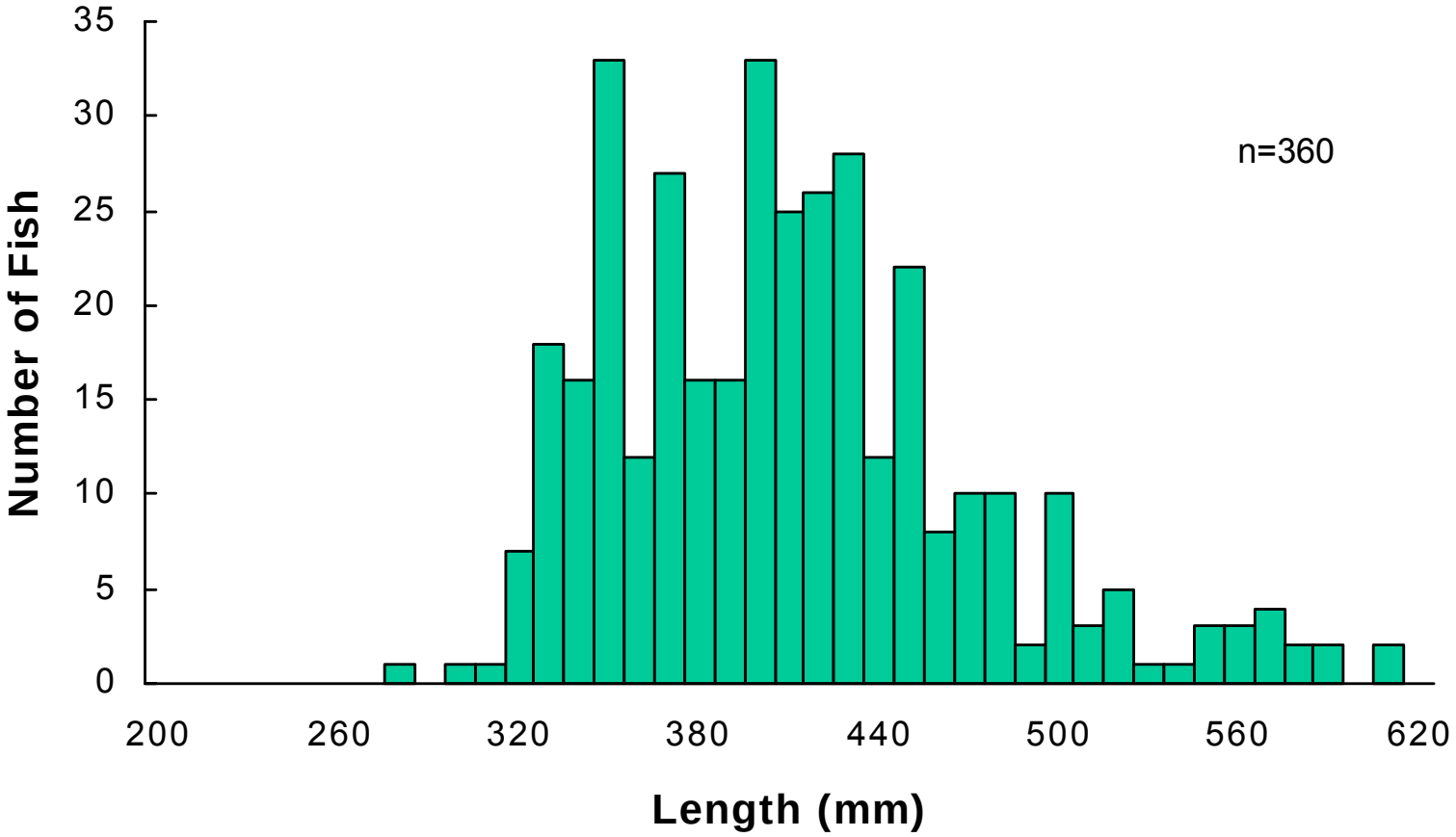


Figure 13. Length frequency of cutthroat trout observed in the harvest, Henrys Lake, 1993.

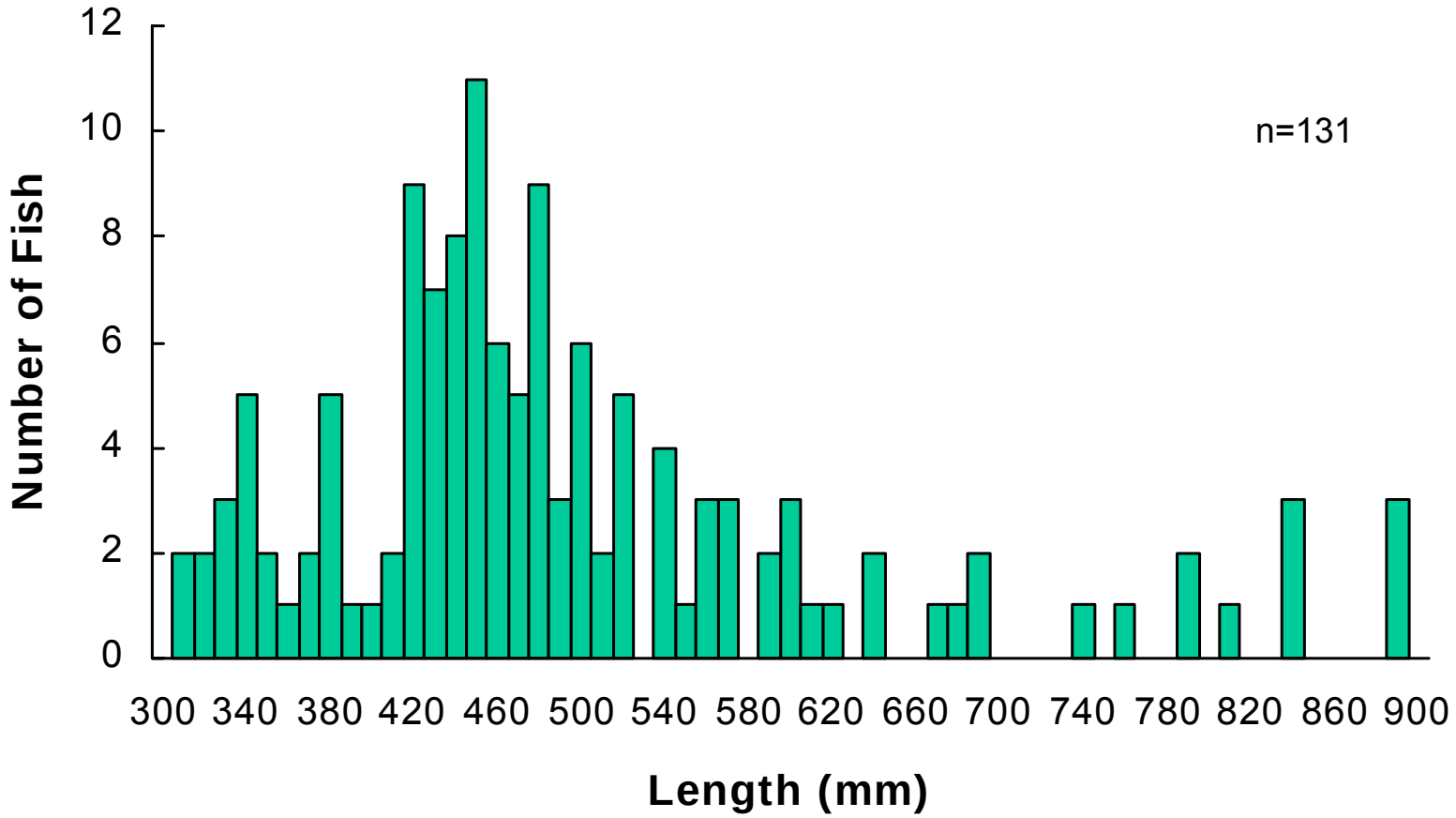


Figure 14. Length frequency of hybrid trout observed in the harvest, Henrys Lake, 1993.

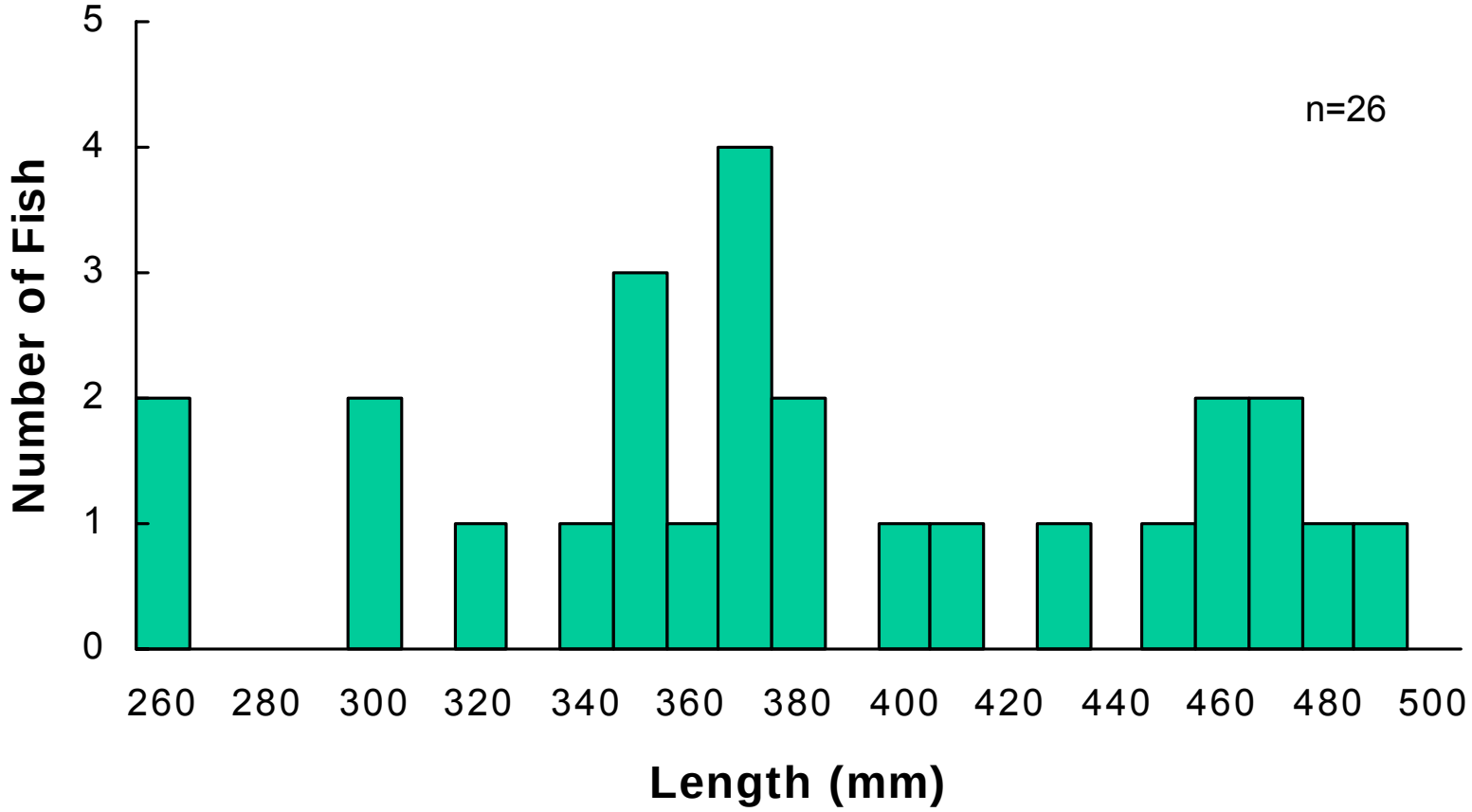


Figure 15. Length frequency of brook trout observed in the harvest, Henrys Lake, 1993.

Fish Population Surveys

Gillnetting in Island Park Reservoir produced what could be called mixed results in the spring immediately following a major lake renovation project. In the spring prior to the renovation, gill net catches were comprised of 92% Utah chub and Utah sucker and 8% game fish (trout and kokanee). Two post-renovation efforts yielded a catch that was still an average of 52% (51% and 53%) Utah chub and Utah sucker (Figure 16). On a more positive note, CPUE for Utah chub and Utah sucker combined decreased from 68 per net-night in spring 1992 to 9 per net-night in spring 1993, an 87% reduction. While many Utah chub and Utah sucker were removed from Island Park Reservoir with the 1992 renovation, it seems clear that many nongame fish survived the treatment and will probably rapidly become overabundant in the reservoir again.

Length frequency distributions of all species sampled are presented in Appendix B.

Palisades Reservoir

Creel Survey

Summary creel statistics and length frequencies for harvested cutthroat and brown trout *Salmo trutta* are presented in Appendix C. Catch statistics for the October 1992 to October 1993 survey period are contrasted with the same statistics from creel surveys during 1980 and 1985 in Table 4. Within the 95 percent confidence limits for those estimates, it is unlikely that the 1993 catch rate differs significantly from those of 1980 or 1985.

The disappointing results of the 1992 cutthroat stocking strategy corroborate results of similar stocking efforts on Palisades Reservoir. Jeppson and Ball (1979) reported that stocking 170,000 eight to nine inch cutthroat trout at the optimal period for spring plankton blooms in 1978 provided only minor improvements in catch rates. The 1978 stocking effort reported by Jeppson was better than our 1992 effort in terms of past managers following recommendations for maximizing the size of hatchery cutthroat and coordinating their release with spring plankton blooms. The 1978 releases were two to three inches larger than our 1992 releases, yet results were no better than in 1993.

After reevaluating poor returns of fingerling finespotted cutthroat trout stocked in Palisades Reservoir in 1984 (overall catch rate of 0.33 fish/hour in 1985), Corsi and Elle (1986) recommended increasing numbers of catchable size cutthroat stocked in preference to fingerlings. This led eventually to the most recent effort of stocking "larger" hatchery cutthroat to minimize the limitations imposed by *Philonema* infestations and maximize return to the creel.

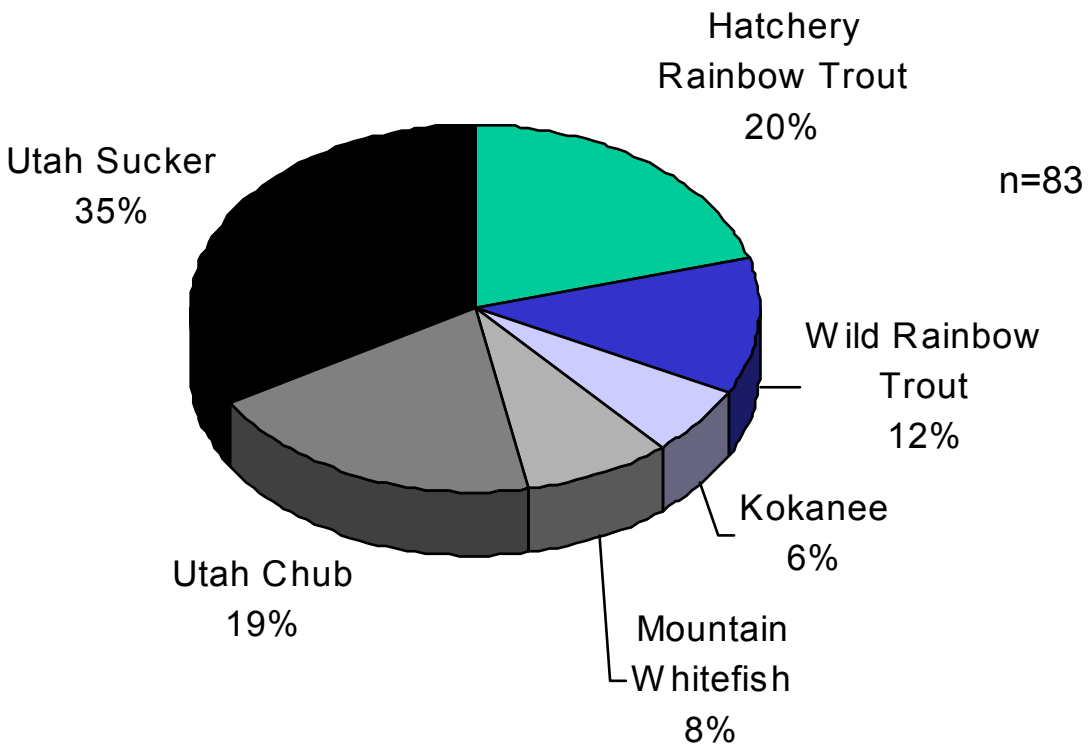


Figure 16. Species composition in experimental gill net catches at Island Park Reservoir, June 18-25, 1993.

Table 4. Catch statistics for Palisades Reservoir, 1980, 1985, and 1993.

Year	Total effort (hrs)	Catch rate	Harvest	HCT	WCT	BRN	LKT
1980	197,180	0.30	57,994	85%	5%	6%	4%
1985	107,660[a]	0.33	33,684[b]	80%	15%	5%	1%
1993	22,506	0.35	7,032	4%[c]	84%	10%	1%

[a] Expanded estimate for 12 months (from May 25 to October 26 census period).
[b] Expanded harvest for 12 months (from May 25 to October 26 census period).
[c] Estimates suspect due to misidentification of wild and hatchery cutthroat.

Catch rates throughout the fishing season were also similar to those reported by previous investigators. Corsi and Elle (1986) found catch rates peaking in May and June at approximately 0.4 fish/hr, dropping to their lowest level in July and August (<0.1 fish/hr) and peaking again at their highest level in late September and early October. We saw spring catch rates peak in April (0.61) and fall catch rates peak in September and October (> 0.70). Summer catch rates dropped to < 0.1 in July and August (Figure 17).

Trends in mean total length of trout in the Palisades Reservoir fishery are summarized in Table 5. Mean cutthroat lengths in the catch were similar among the 1980, 1985, and 1993 seasons at roughly 356 mm. Mean brown trout lengths also have been similar since the 1975 season at approximately 432 mm. Lake trout lengths were greater in 1993 than any of the previous surveyed seasons but were only represented by three fish total for the season.

Overall, it is obvious that with cutthroat trout providing the bulk of the Palisades Reservoir fishery (Table 4), significant improvement in seasonal catch rates will depend on a management program which emphasizes either a new target species or a combination of cutthroat and one or more new species.

The very low total effort for the 1992-1993 survey period, 22,506 hours (Table 4) is a 79% decline from 1985 and an 89% decline from 1980. As much as the continued poor catch rates, the low effort illustrates the poor quality of the Palisades Reservoir fishery and the low public satisfaction with it.

Ririe Reservoir

Creel Survey

The creel survey at Ririe Reservoir revealed that catchable rainbow trout, fingerling-stocked rainbow trout, yellow perch *Perca flavescens*, and kokanee were the dominant fish in the catch, representing 32%, 24%, 23%, and 16% of the catch respectively. This will be important information for future management, especially as perch become more abundant and provide increasingly greater potential as a staple fishery. Further creel survey results including length-frequencies of fish in the creel are presented in Appendix D.

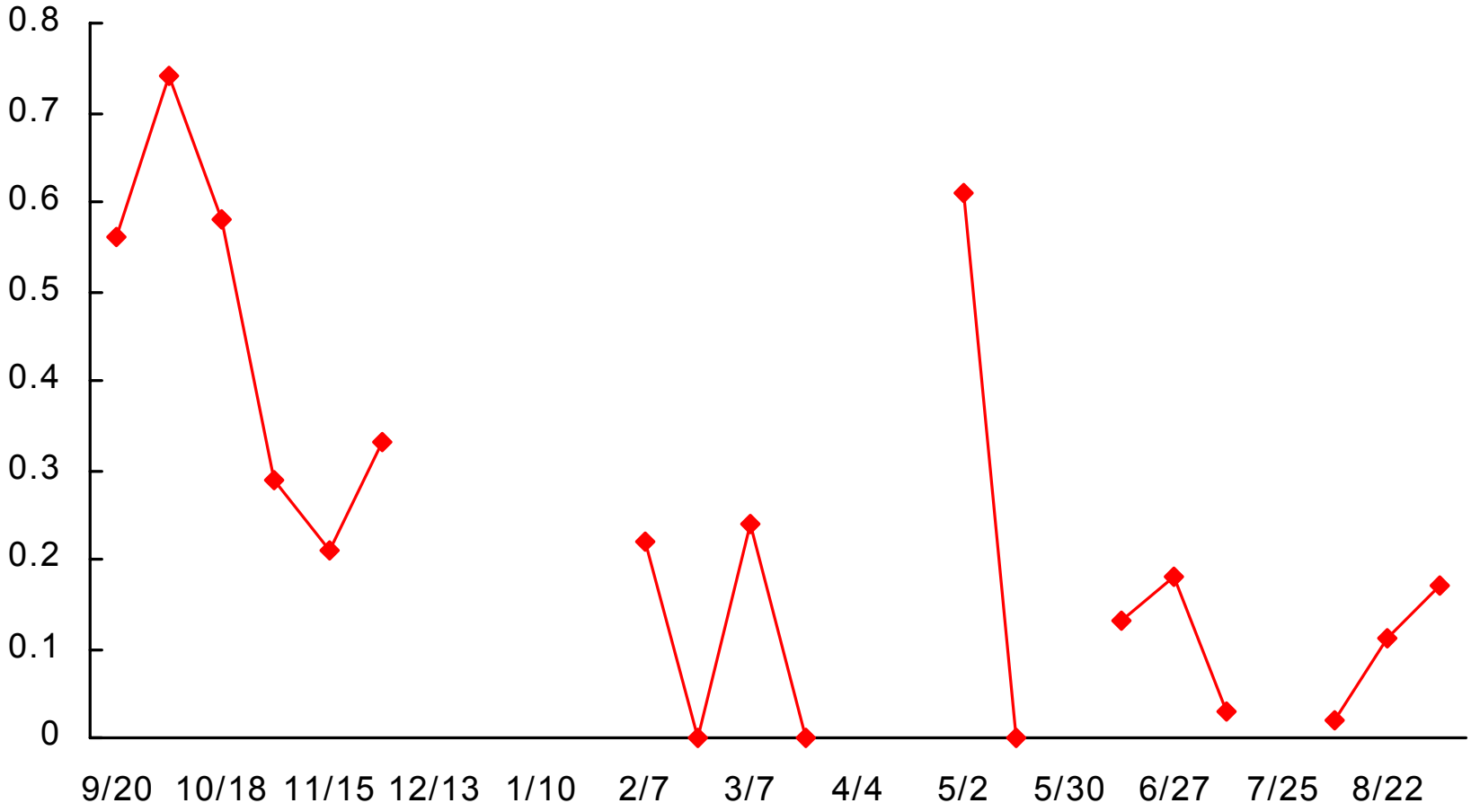


Figure 17. Seasonal trends in catch rates in Palisades Reservoir, 1992-1993.

Table 5. Trends in the mean total length of trout from Palisades Reservoir measured from the anglers creel, 1963-1993.

Year	Cutthroat[a]	Brown Trout	Lake Trout	Reference
1963	315 mm (12.4 in)	353 mm (13.9 in)	465 mm (18.3 in)	Jeppson 1964
1964	327 mm (12.9 in)	391 mm[b] (15.4 in)	411 mm (16.2 in)	Jeppson 1965
1965	320 mm (12.6 in)	353 mm (13.9 in)	457 mm (18.0 in)	Jeppson 1966
1970	343 mm (13.5 in)	414 mm (16.3 in)	447 mm (17.6 in)	Jeppson 1971
1975	389 mm (15.3 in)	427 mm (16.8 in)	389 mm (15.3 in)	Jeppson 1976
1980	364 mm (14.3 in)	443 mm (17.4 in)	379 mm (14.9 in)	Moore et al. 1981
1985	364 mm (14.3 in)	429 mm (16.9 in)	472 mm (18.6 in)	Corsi and Elle 1986
1993	360 mm (14.2 in)	439 mm (17.3 in)	525 mm (20.7 in)	

[a] Includes both hatchery and wild cutthroat.
[b] Includes fish taken in gillnets.

Catchable Trout Evaluation

The creel survey resulted in a total estimated catch of 11,009 rainbow trout for the May 29-September 6, 1993 period. Super catchable rainbow trout were recognizable because all of those stocked had adipose fin clips. Super catchables represented 59% of all rainbow trout caught (6,534 fish +/-1,720). Fingerling stocked rainbow trout were identified by rippled (eroded in the past) dorsal and ventral fins. Because of our inability to definitely recognize wild produced rainbow trout in the creel (which we believe were relatively insignificant), we counted any rainbow trout in the creel that had an adipose fin as having a fingerling stocking origin. Fingerling stocked rainbows then represented 49% of all rainbow trout in the creel (4,475 fish +/-1,216).

Using those point estimates of total return to the creel and actual mean fish lengths in the creel, a table of results was derived (Table 6). In Table 6, the best case scenario for fingerling stockings considers only the 4.5 - 6.0" fingerlings stocked in spring 1992 as recruiting to the creel in 1993. In contrast, the worst case scenario for fingerling stockings assumes that all fingerling (4.5 - 6.0") and sub-catchable (8.2 - 8.5") rainbow trout stocked in 1992 recruited to the creel in 1993. Even in the best case fingerling scenario, super catchables were 37% more efficient in cost per fish in the creel and 66% more efficient in cost per pound of fish in the creel than fingerling stocking. While these figures did not consider 1993 return to the creel outside the survey period (Sept., Oct., Nov.), they probably provide good insight into the relative efficiency of stocking different sizes of hatchery rainbow trout in Ririe Reservoir.

Table 6. Results of Ririe Reservoir super catchable evaluation.

	Super catchable	Best-case fingerling	Worst-case fingerling
Number stocked	12,019	162,530	210,870
Weight (lbs) stocked	8,465	9,150	16,266
Total number creeled (estimated)	6,534	4,475	4,475
Total weight creeled (estimated)	5,815	2,148	2,148
Average length in creel (inches)	13.0	10.6	10.6
Average weight in creel (lbs)	0.89	0.48	0.48
Percent return by number	54.4	2.8	2.1
Percent return by weight	68.7	23.5	13.2
Total cost	$17,353	$18,758	$33,345
Cost/fish in creel	$2.65	$4.19	$7.45
Cost/lb of fish in creel	$2.98	$8.73	$15.52

Fish Population Surveys

Three gill nets set in Ririe Reservoir for three hours caught 274 Utah chub, 98 Utah sucker, 18 hatchery rainbow trout, and 3 redside shiners *Richardsonius balteatus*, representing 70, 25, 5 and <1% of the catch respectively.

Two trap nets fished overnight in Ririe Reservoir caught 406 Utah chub, 76 Utah sucker, 5 yellow perch and 1 smallmouth bass, representing 83, 16, 1 and <1% of the catch, respectively.

Utah chub are clearly the predominant fish in Ririe Reservoir followed probably by Utah sucker. Past surveys produced similar results (Gamblin 1995). The challenge will be to maintain a satisfactory fishery in the presence of a great standing crop of Utah chub and Utah suckers using hatchery trout products, non-native cool and cold water species, and perhaps kokanee.

Bass Tournaments

Tracking CPUE through the eight bass tournaments held at Ririe Reservoir in 1993 revealed relatively low catch rates for legal (>=12") smallmouth bass (<0.1 fish/hr). Catch rates for legal fish peaked at 0.5 fish/hr in the fall. Catch rates for all smallmouth bass averaged 0.8 fish/hour throughout the summer but increased to as high as 1.4/hr in the fall. The exact cause of the increased CPUE in the fall is unclear but could be related to one or both of the following factors: increased vulnerability of bass to angling in fall, or expected increasing CPUE with decreasing effort. Close inspection of Figure 18 indicates the seasonal factor is probably more controlling than the effort factor.

The length frequency distribution of smallmouth bass weighed in during the July 17-18 tournament shows fairly healthy size distribution with several fish exceeding 16 inches TL (410 mm; Figure 19). Scales were collected and pressed on acetate for age and growth estimation

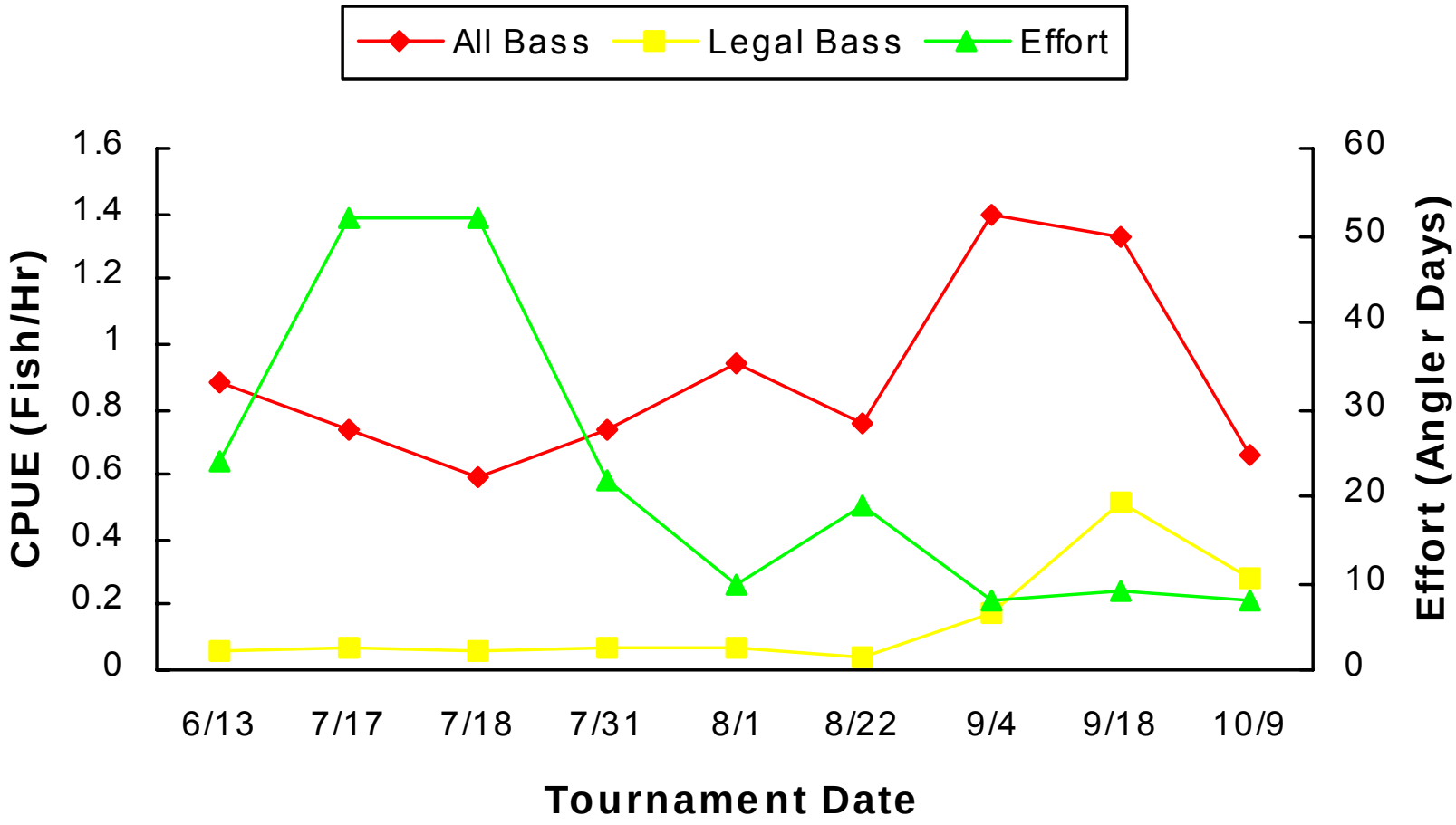


Figure 18. Effort and catch rates for all bass and legal bass in Ririe Reservoir bass tournaments, 1993.

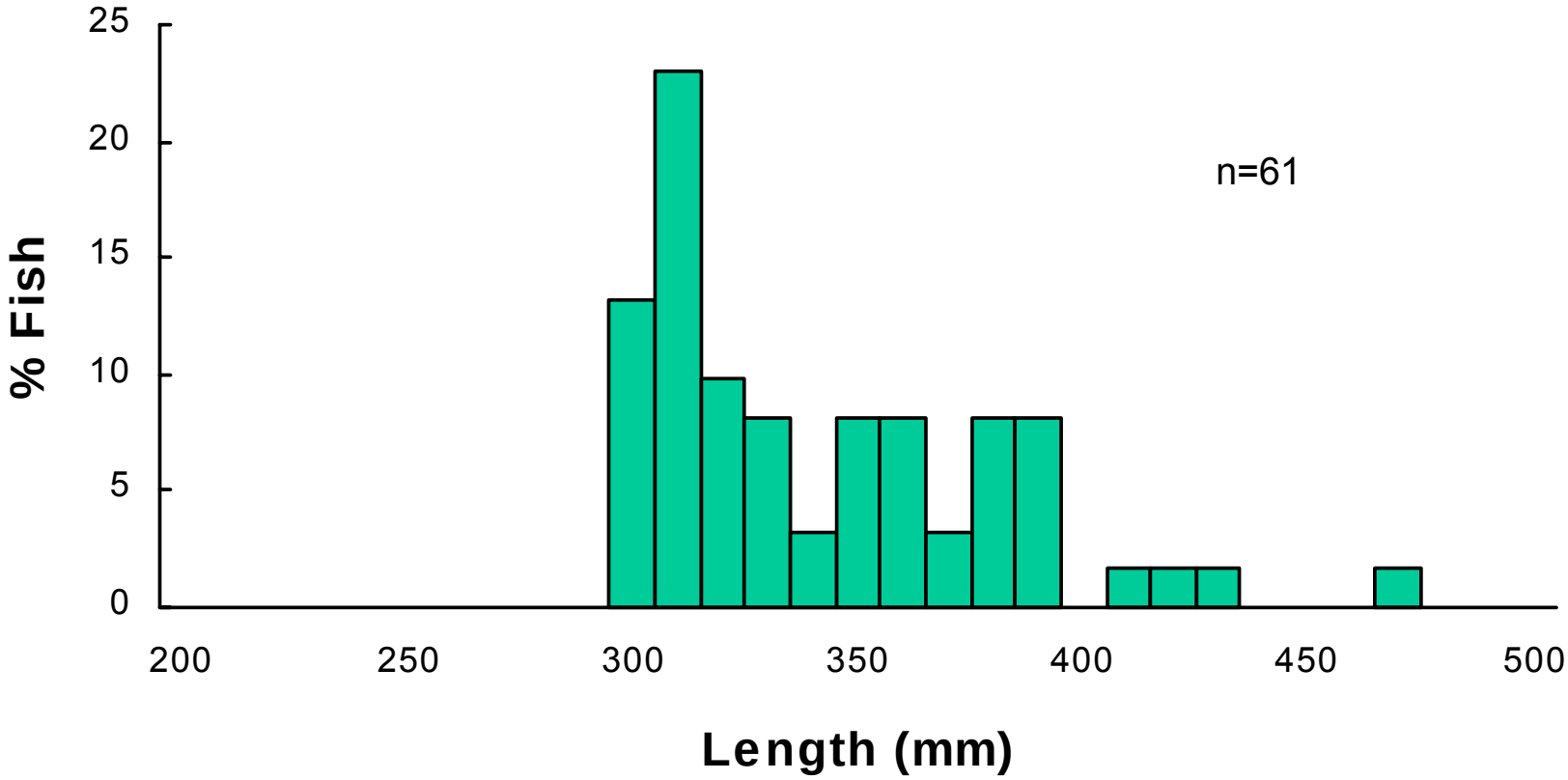


Figure 19. Length frequency of legal (weighed-in) smallmouth bass from a tournament on Ririe Reservoir, July 17-18, 1993.

but have not been read as of this writing. When they are read, growth rates will be compared with those found in an earlier study by Dillon (1992).

Mud Lake

Winterkill

Three gill nets fished overnight on 14 May 1993 yielded no fish. A fairly intensive visual search of the lake's shallows using a trained observer wearing polarizes sunglasses and perched on the deck of a slowly moving boat also revealed no live fish. The lack of success of these two efforts led us to believe the winterkill was nearly complete.

Fish Population Surveys

Mud Lake was gillnetted overnight on September 21, 1993 (two experimental nets). Small numbers of Utah sucker, Utah chub, yellow perch, and bullhead *Ameiurus* spp. were captured. The size and species of fish captured indicated they either survived the winterkill and/or emerged from refugia since spring. It was determined there probably were sufficient numbers and sizes of fish in the lake at this time to stock advanced fingerling tiger muskies without undue fear of them not having prey available to them.

Post Winterkill Restocking

An extensive effort was made to restock Mud Lake in 1993 in order to restore it to status as a popular southeast Idaho public fishery. We actually looked upon the winterkill as an opportunity to possibly start over and get the lake on a track of producing pounds of game fish flesh instead of living space for a large standing crop of non-game fish. The main strategy we employed in our restocking effort was to reestablish the largemouth bass population as soon as possible, flood the habitat with desirable planktivorous and insectivorous game fish (yellow perch and bluegill *Lepomis macrochirus*) and provide novelty fisheries with Lahontan cutthroat trout, tiger muskie and channel catfish. A complete list of fish species and numbers stocked is presented in Appendix E.

RECOMMENDATIONS

Henrys Lake

1. Evaluate the status of the Henrys Lake Utah chub population.
2. Expand annual trout population survey efforts to provide a reliable lake population estimate.
3. Estimate the annual exploitation rate for the Henrys Lake trout population.
4. Evaluate introgression of rainbow trout genetic traits in the Henrys Lake cutthroat trout population.

Island Park Reservoir

1. Continue to monitor the status of Utah chub and Utah sucker populations following 1992 rotenone renovation.
2. Evaluate the recovery of the Island Park Reservoir fishery with structured creel survey.
3. Include Island Park Reservoir in the evaluation of splake trout for sport fishing and Utah chub management benefits.
4. Assess recruitment of reservoir-stocked trout to Henrys Fork Snake River.

Palisades Reservoir

1. Discontinue use of Snake River finespotted cutthroat trout as the primary management species.
2. Work with Wyoming Game and Fish Department and Jackson National Fish Hatchery for agreement on alternate management species.

Ririe Reservoir

1. Reduce hatchery fingerling rainbow trout stockings.
2. Increase hatchery super catchable rainbow trout stockings.
3. Continue kokanee salmon stockings.
4. Evaluate natural recruitment of kokanee salmon from Willow Creek to Ririe Reservoir.
5. Continue evaluation of splake trout and lake trout for sport fishery and Utah chub management benefits.

Mud Lake

1. Acquire additional pre-spawned bluegill for post-winter kill restocking.
2. Continue evaluation of post-winterkill fish population recovery with spring gillnetting and trapnetting.

LITERATURE CITED

Corsi, C., and S. Elle. 1986. Regional fisheries management investigations. Idaho Department of Fish and Game, 1985 Job Performance Report, Project F-71-R-10, Boise.

Dillon, J.C. 1992. Smallmouth bass fisheries investigations. Idaho Department of Fish and Game, 1991 Job Performance Report, Project F-73-R-14, Boise.

Gamblin, M. 1995. Regional fisheries management investigations. Idaho Department of Fish and Game, 1992 Job Performance Report, Project F-71-R-17, Boise.

Jeppson, P. 1964. Tests for increasing the returns of hatchery trout: Palisades Reservoir fishery investigation. Idaho Department of Fish and Game, 1963 Job Performance Report, Project F-32-R-6, Boise.

Jeppson, P. 1965. Tests for increasing the returns of hatchery trout: Palisades Reservoir fishery investigation. Idaho Department of Fish and Game, 1964 Job Performance Report, Project F-32-R-7, Boise.

Jeppson, P. 1966. Tests for increasing the returns of hatchery trout: Palisades Reservoir, Island Park Reservoir and Medicine Lodge Creek fishery investigations. Idaho Department of Fish and Game, 1965 Job Performance Report, Project F-32-R-8, Boise.

Jeppson, P. 1971. Statewide fisheries inventory: Upper Snake fisheries inventory. Idaho Department of Fish and Game, 1970 Job Performance Report, Project F-62-R-1, Boise.

Jeppson, P. 1976. Palisades Reservoir fisheries investigations. Idaho Department of Fish and Game, 1975 Job Performance Report, Project F-53-R-11, Boise.

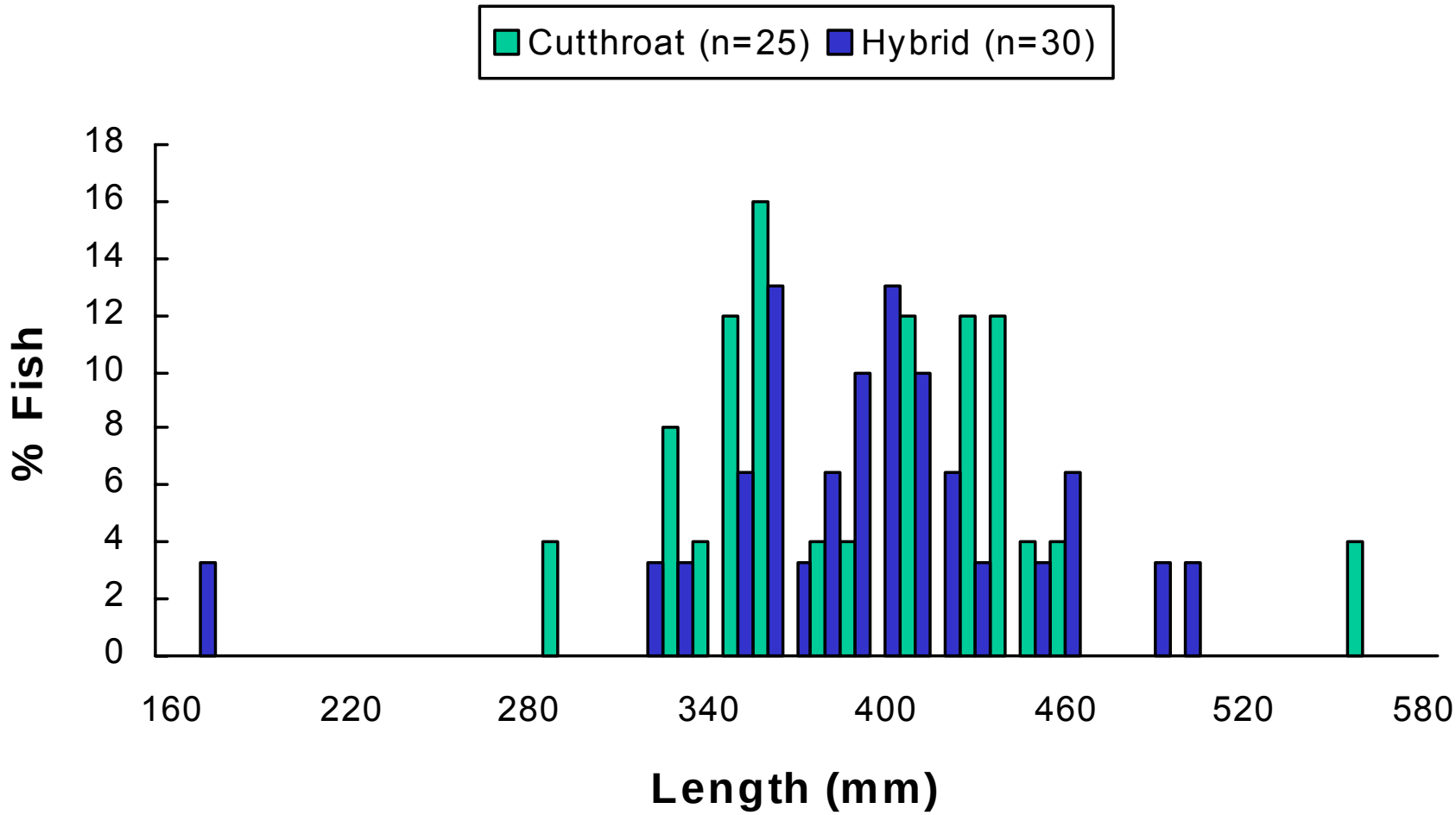
Jeppson, P., and K. Ball. 1979. Regional fisheries management investigations. Idaho Department of Fish and Game, 1978 Job Performance Report, Project F-71-R-3, Boise.

Moore, V, K. Aslett, and C. Corsi. 1981. South Fork Snake River fisheries investigations. Idaho Department of Fish and Game, 1980 Job Performance Report, Project F-73-R-3, Boise.

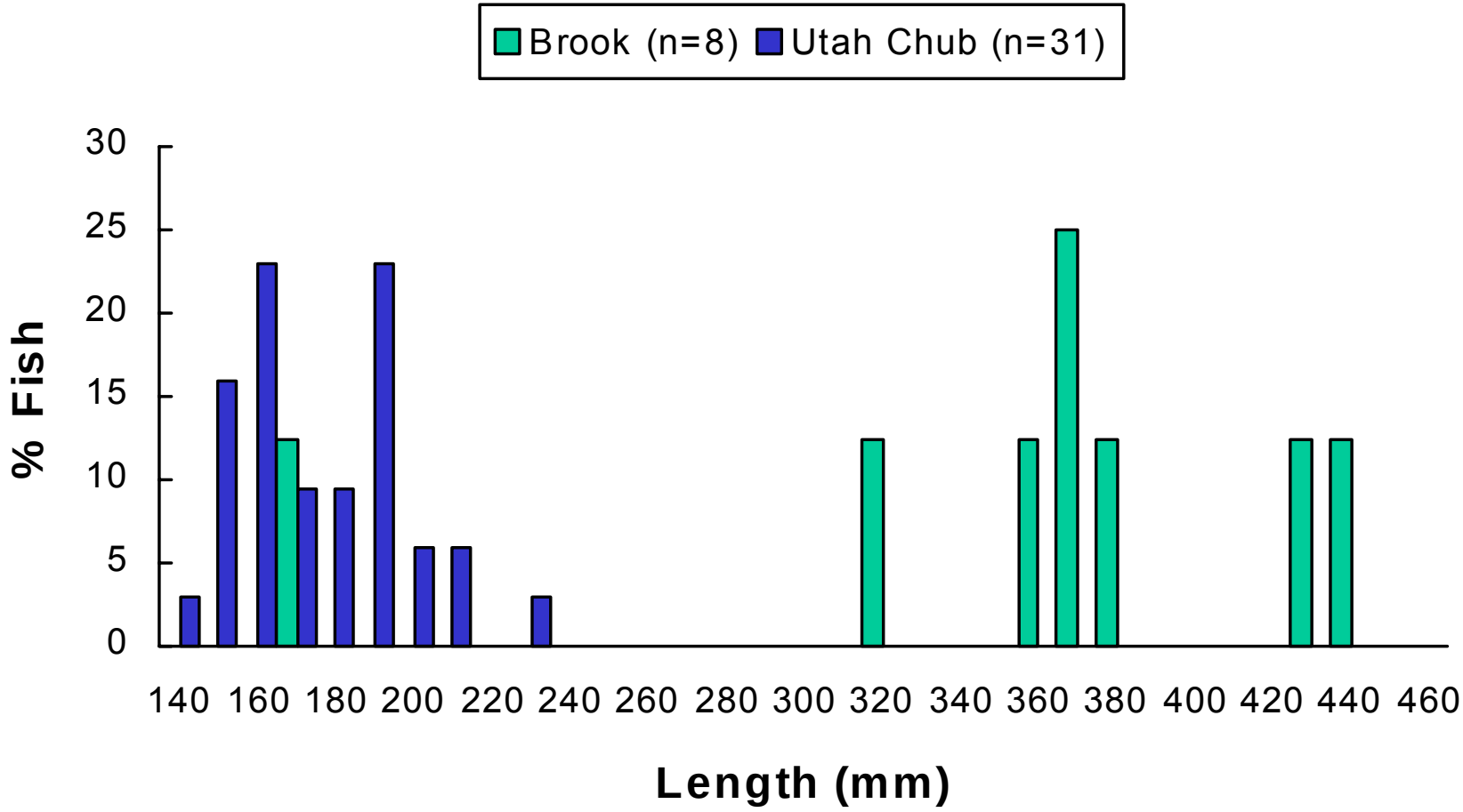
APPENDICES

Appendix A. Length frequencies of trout and Utah chub sampled with gill nets in Henrys Lake, June 18 - July 8, 1993.

Appendix A. Henrys Lake, 1993.



Appendix A. Henrys Lake, 1993.



Appendix B. Post-renovation fish stocking and length frequencies of fish sampled with gill nets in Island Park Reservoir, 1993.

ISLAND PARK RESERVOIR POST-RENOVATION
RESTOCKING, 1992-1993

Fall 1992

Species	Number	Size
Rainbow trout	40,000	6-10”
	50,000	9”
Rainbow x Cutthroat Hybrid	400,000	~4”
Lahontan Cutthroat	200,000	~4-5”
Kokanee	210,000	~5”
Subtotal =	900,000	

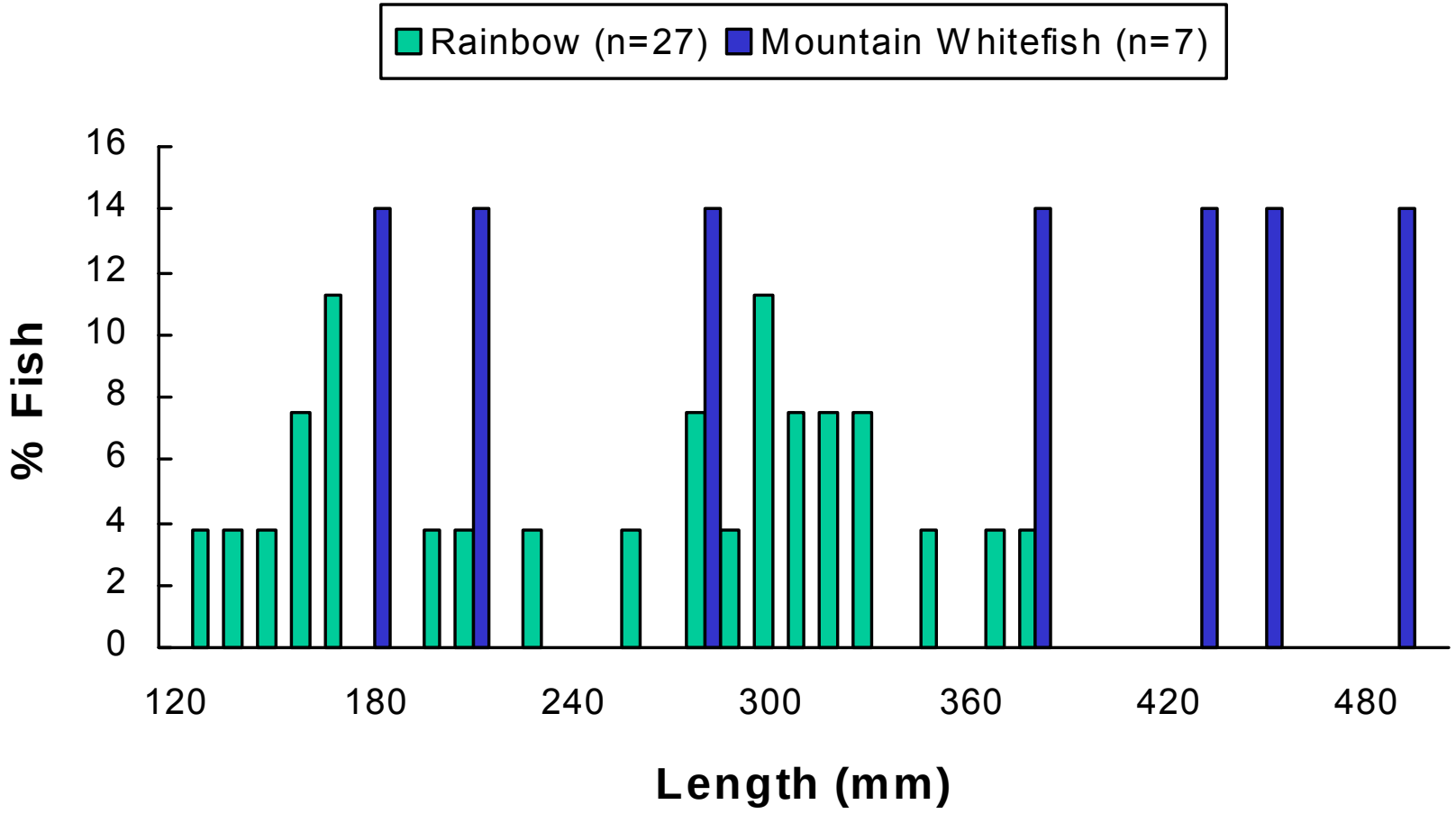
Spring 1993

Species	Number	Size
Rainbow trout	450,000	4”
	90,000	7”
Kokanee	300,000	3”
Subtotal =	840,000	

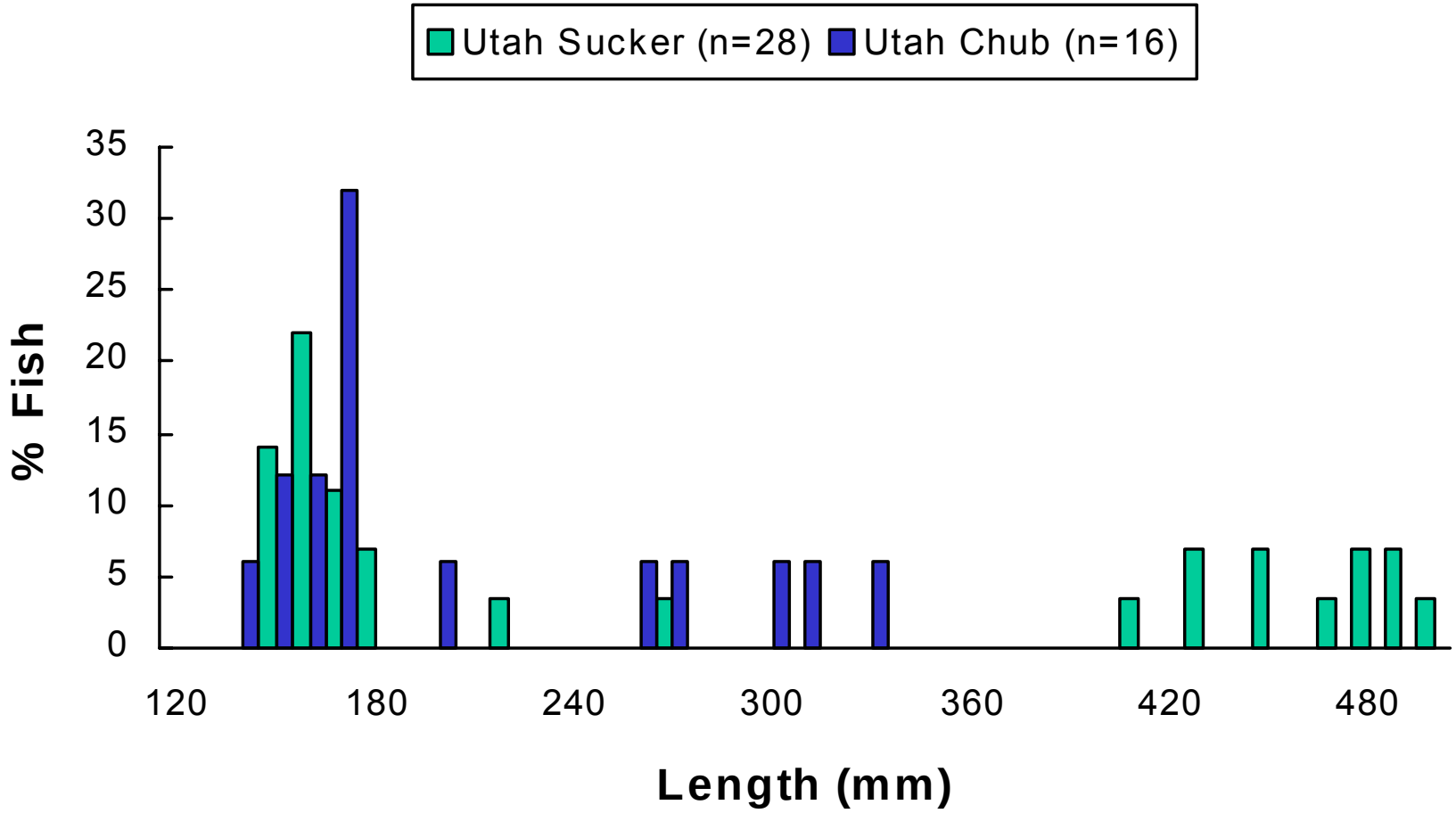
Fall 1993

Species	Number	Size
Rainbow x Cutthroat Hybrid	500,000	3”
Lahontan Cutthroat	50,000	5”
Subtotal =	550,000	
Grand Total =	2,290,000	

Appendix B. Island Park Reservoir, 1993.



Appendix B. Island Park Reservoir, 1993.



Appendix C. Creel census summary statistics and length frequencies of harvested fish in Palisades Reservoir, 1992-1993.

ANGLER SUMMARY REPORT
IDAHO DEPARTMENT OF FISH AND GAME

Body of Water: Palisades Reservoir EPA number: 170040104

Angler Composition
Total Number of Anglers: 910
Percent of Residents: 96.15%
Percent of Non-residents: 3.85%

Total Number of Interviews: 378
Average Number of Anglers/Interview: 2.42 (Ririe = 2.41)
Percentage of Interviews with:
1 angler: 11.90%
2 anglers: 54.76%
3 anglers: 17.72%
4 anglers: 12.96%
5 anglers: 1.59%
>5 anglers: 1.06%

Percentage of Anglers

Catching:		Releasing:		Harvesting:	
0:	51.21%	0:	89.56%	0:	54.84%
1:	15.49%	1:	3.19%	1:	14.51%
2:	10.22%	2:	0.99%	2:	10.00%
3:	5.05%	3:	1.21%	3:	4.62%
4:	2.97%	4:	1.32%	4:	3.74%
5:	2.97%	5:	0.99%	5:	2.09%
more than 6:	12.09%	more than 6:	2.75%	more than 6:	10.22%

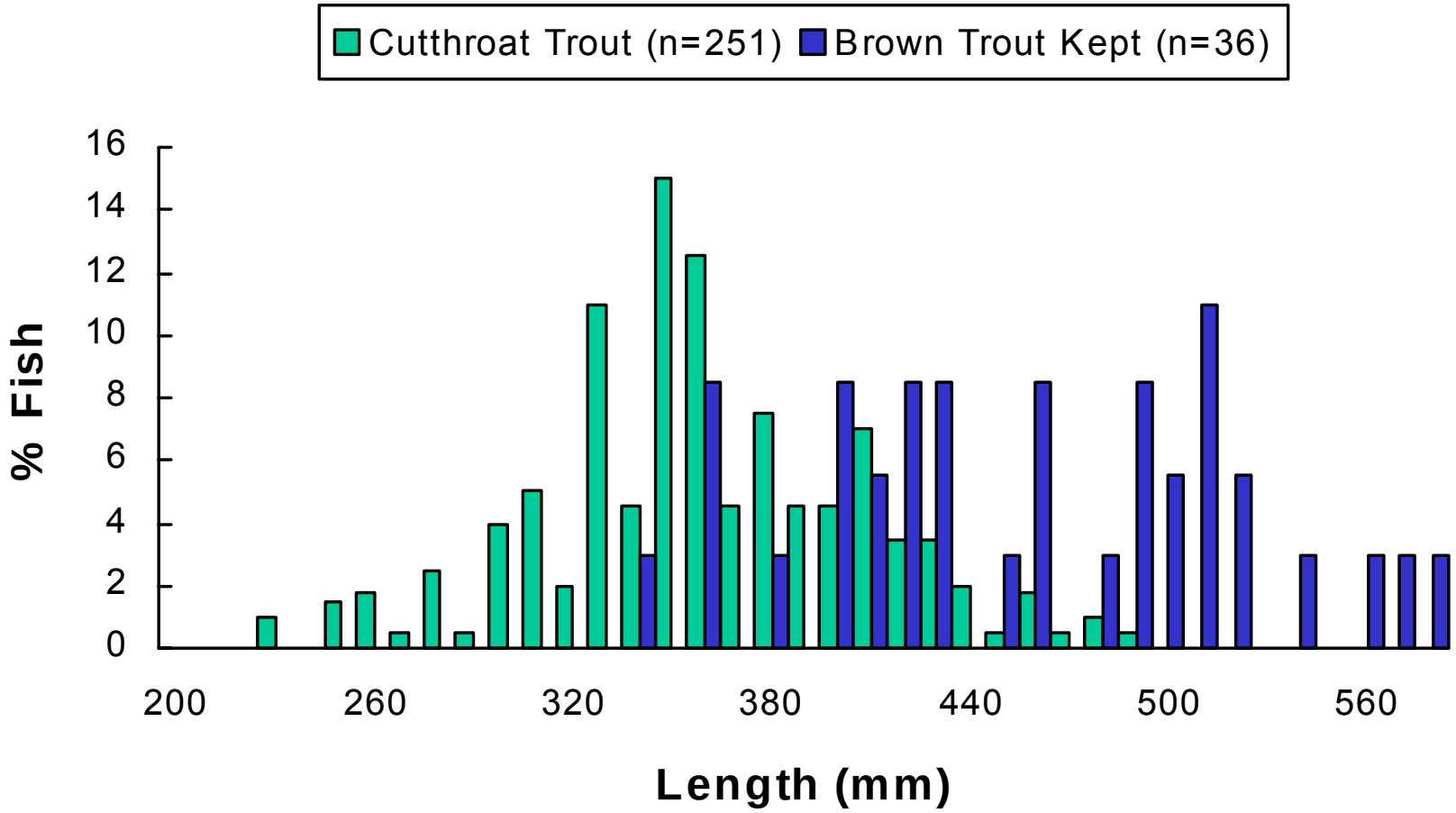
Type of Fishing (from Instantaneous Counts)
Boat: 55.84%
Bank: 31.01%
Tube: 0.11%
Ice: 13.03%

Catch Composition:

WCT:	83.65%	HCT:	4.40%
BRN:	9.91%	LKT:	1.26%
KOK:	0.79%	WF:	0.00%

Number of Completed Trips: 185/370 = .489
Average Time Spent Fishing: 4.38 hours

Appendix C. Palisades Creel, 1992-1993.



Appendix D. Creel census summary statistics and length frequencies of harvested fish in Ririe Reservoir, 1993.

ANGLER SUMMARY REPORT
IDAHO DEPARTMENT OF FISH AND GAME

Body of Water: Ririe Reservoir EPA number: 17040205001

Angler Composition
Total Number of Anglers: 1810
Percent of Residents: 98.07%
Percent of Non-residents: 1.93%

Total Number of Interviews: 747
Average Number of Anglers/Interview: 2.41 (Palisades = 2.42)
Percentage of Interviews with:

1 angler:	17.00%
2 anglers:	42.30%
3 anglers:	21.02%
4 anglers:	12.72%
5 anglers:	2.54%
>5 anglers:	2.01%

Percentage of Anglers

Catching:		Releasing:		Harvesting:	
0:	51.93%	0:	96.57%	0:	54.97%
1:	15.08%	1:	0.77%	1:	14.70%
2:	8.29%	2:	0.39%	2:	7.85%
3:	8.23%	3:	0.88%	3:	7.51%
4:	3.87%	4:	0.33%	4:	3.43%
5:	2.71%	5:	0.28%	5:	2.60%
more than 6:	9.89%	more than 6:	0.77%	more than 6:	8.95%

Type of Fishing (from Instantaneous Counts)

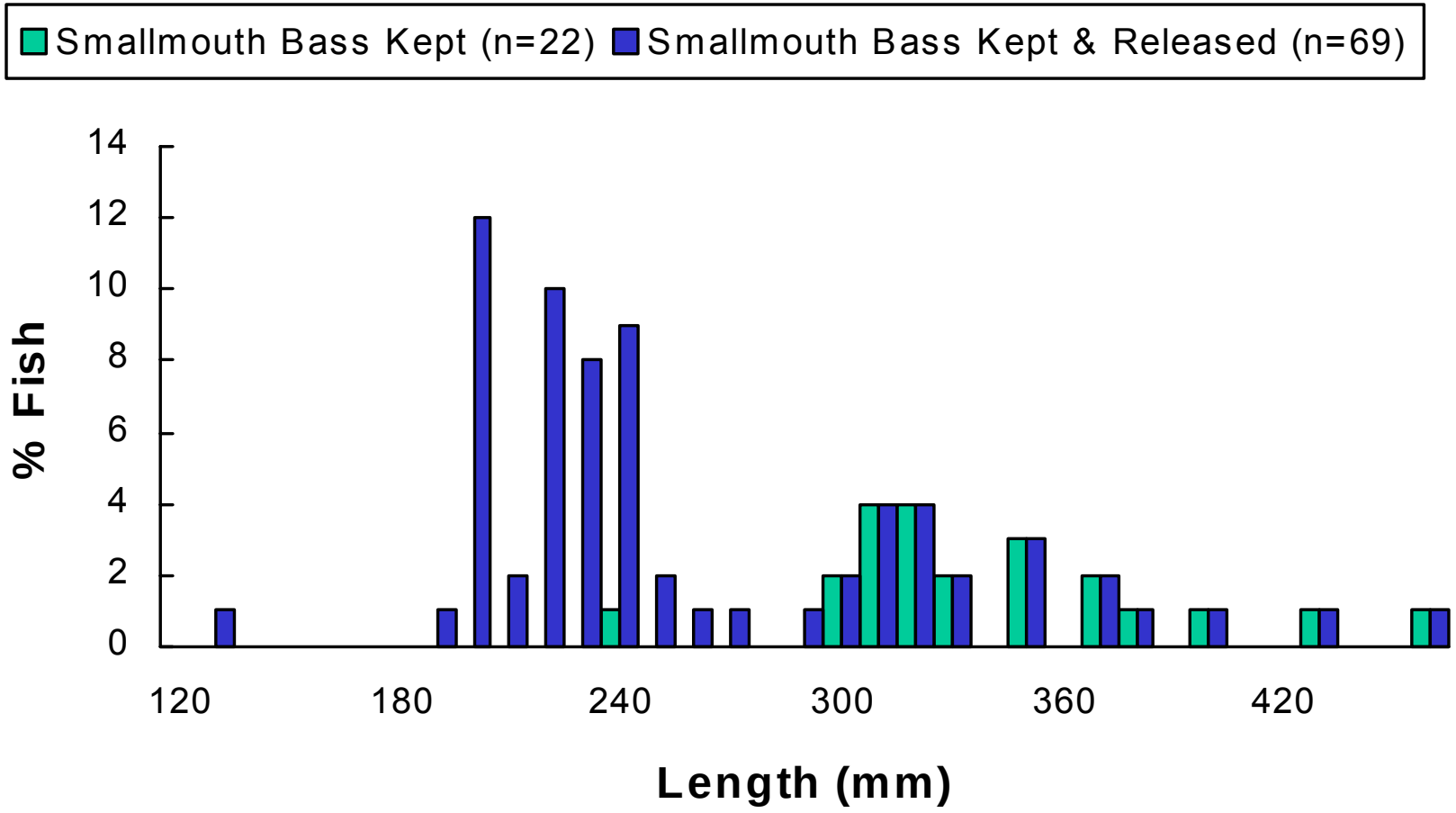
Boat:	44.87%
Bank:	54.78%
Tube:	0.34%
Ice:	0.00%

Catch Composition:

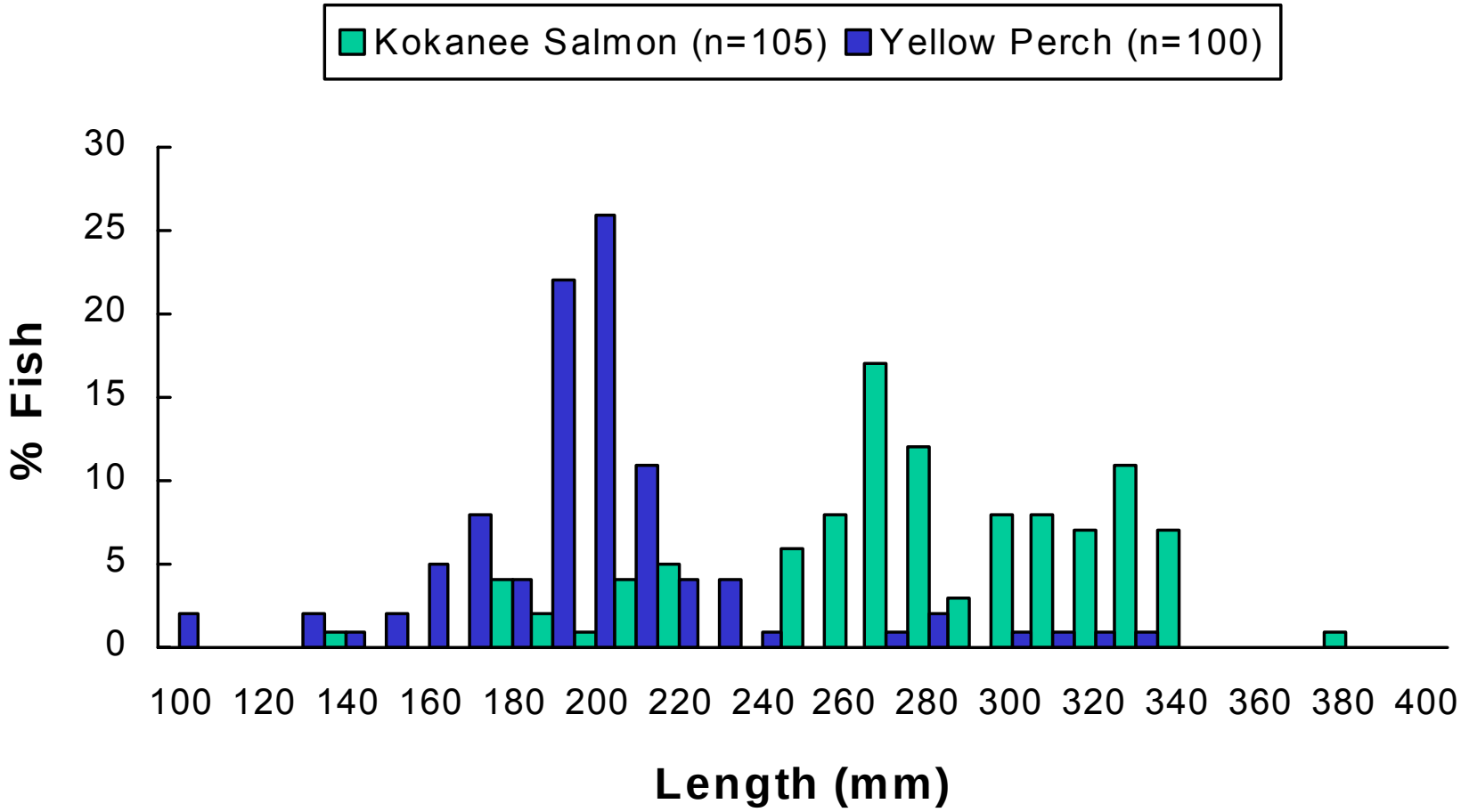
CRB:	31.88%	FRB:	24.32%
KOKANEE:	15.76%	SMB:	4.55%
Y. PERCH:	23.22%	CTR:	0.09%

Number of Completed Trips: 337/747 = .451
Average Time Spent Fishing: 3.34 hours

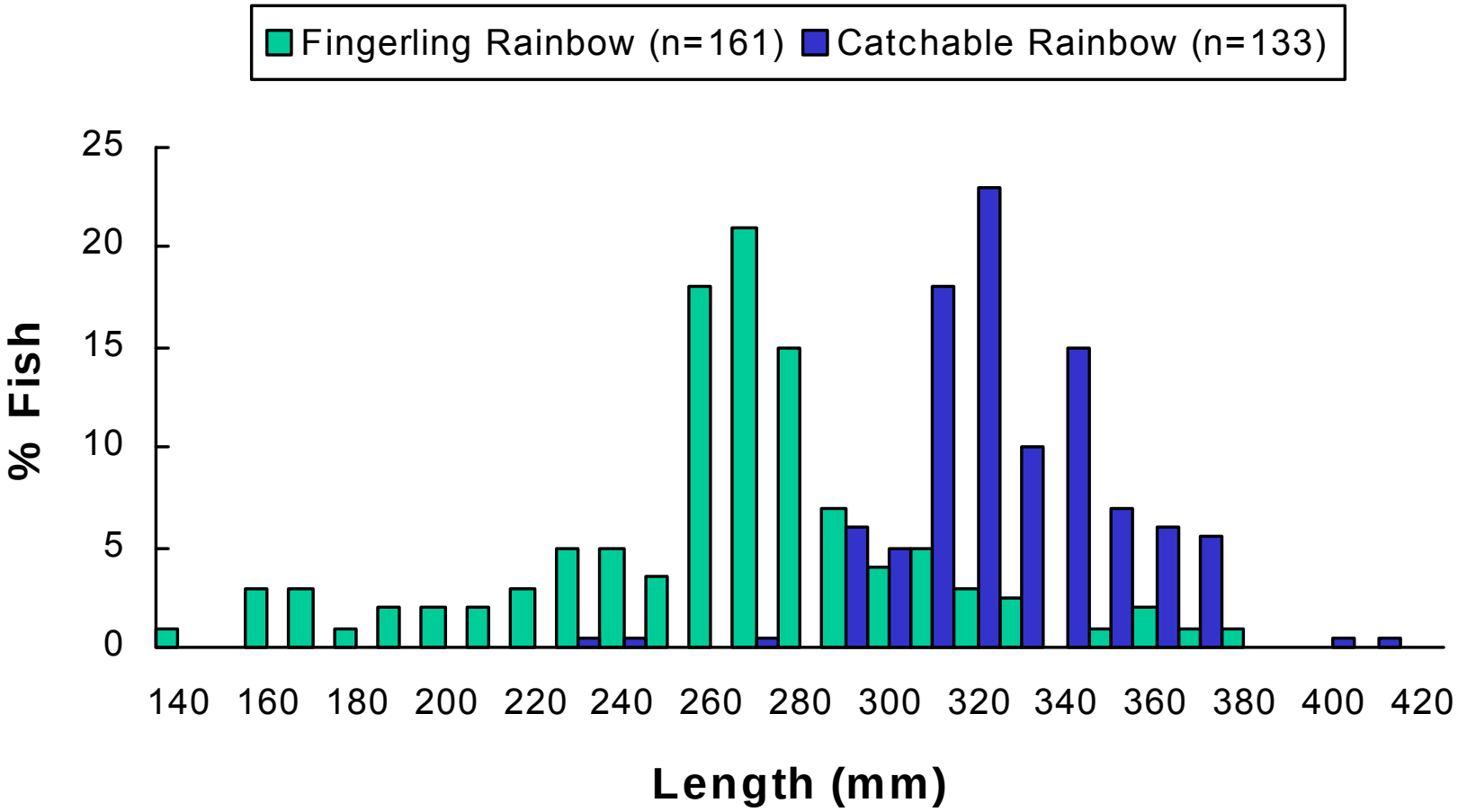
Appendix D. Ririe Reservoir Creel, 1993.



Appendix D. Ririe Reservoir Creel, 1993.



Appendix D. Ririe Reservoir Creel, 1993.



Appendix E. Mud Lake post-winterkill restocking.

Mud Lake Post-Winterkill Restocking Effort (1993)

Date	Water/Area Stocked	Species	Number	Size	Origin
5/19	Mud Lake	Largemouth bass	550	6-8”	Region 5
5/20	Mud Lake	Bluegill	360	6-9”	CJ Strike/Crane Falls Lake
5/20	Mud Lake		50	10-14”	Crane Falls Lake
5/20	Mud Lake	Yellow perch	50	8”	CJ Strike
6/4	Mud Lake	Lahontan cutthroat	24,000	10”	Nampa Hatchery
7/29	Mud Lake	channel catfish	5,000	2-3”	Private hatchery
7/29	Mud Lake	largemouth bass	15,000	Fingerling	Private hatchery
7/29	Roberts Gravel Pond	channel catfish	1,000	2-3”	Private hatchery
7/29	Mud Lake	yellow perch	3,200	7-9”	N. Fork Payette River
9/23	Mud Lake	largemouth bass	300	3.5-8”	Spring Valley Reservoir
10/6	Mud Lake	tiger muskies	1,400	12”	Private hatchery

1993 ANNUAL PERFORMANCE REPORT

State of: Idaho | Program: Fisheries Management F-71-R-18

Project I: Surveys and Inventories | Subproject I-G: Upper Snake Region

Job: c | Title: Rivers and Streams Investigations

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

South Fork Snake River

Population estimates and species composition for the Lorenzo and Conant Valley reaches of the South Fork Snake River in 1993 were comparable to previous years. Total cutthroat trout *Oncorhynchus clarki* densities in the Lorenzo reach were lower in 1993 than 1991. Survival and recruitment of young (age 2+) cutthroat trout appear to be increasing in the Conant Valley reach and may indicate population benefits from improved winter flows over the last two to three winters.

Brown trout *Salmo trutta* aerial redd counts in the South Fork Snake River were down 48% from those done in 1991.

Henrys Fork Snake River

The trout population in the Henrys Fork above the Mack's Inn Bridge is dominated by brook trout *Salvelinus fontinalis*. Wild rainbow trout *O. mykiss* comprise the remainder of the trout population. Most trout in this river reach were less than 200 mm in length. Age and growth analysis indicates moderate rainbow trout growth, but good growth for brook trout.

A Box Canyon population estimate documented a substantial increase in numbers of trout since our previous 1991 population estimate. This sudden improvement in population size is best explained by emigration of Island Park Reservoir hatchery rainbow trout during the 1992 Island Park Reservoir drawdown.

Little Lost River

Trout and char numbers have declined in selected survey sections since 1987. Drought and/or increased angler harvest are suggested as likely causes.

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INTRODUCTION AND METHODS

South Fork Snake River

Fish Population Surveys

Annual abundance estimates for South Fork Snake River trout populations in the Lorenzo and Conant Valley reaches were resumed in 1993 after the 1992 estimates were dropped due to unexpected flow reductions from Palisades Reservoir.

Population estimates and aerial brown trout *Salmo trutta* redd surveys were conducted following the methods described by Elle and Gamblin (1993). Population estimates were made in September and October and aerial brown trout redd counts were completed in early December.

Henrys Fork Snake River

Fish Population Surveys

Big Springs to Macks Inn Reach-Fish were sampled on three different days September 13-22, 1993 with drift boat electrofishers. The sample reach was from the railroad trestle downstream of Big Springs to a point just upstream of the Macks Inn Bridge (Highway 20). Daily effort ranged from one boat making one pass per day to two boats making two passes per day. Trout >150 mm TL were marked with a caudal punch for inclusion in a mark-recapture population estimate.

Box Canyon Reach-Fish were sampled on seven different days from August 5-26, 1993 with drift boat electrofishers. The sample reach was from the Buffalo River downstream to the rock pile just upstream of the low gradient Last Chance reach. Daily effort ranged from one boat making one pass per day to two boats making two passes per day. Trout >150 mm TL were marked with a caudal punch for use inclusion in a mark-recapture population estimate.

Buffalo River-Fish were sampled on July 16 with a canoe-mounted generator and VVP and three wading workers. The only reach sampled was from USFS handicapped fishing dock downstream to the Highway 20 bridge. Trout >150 mm TL were marked with caudal punch for use inclusion in a mark-recapture population estimate.

Little Lost River (Sawmill Creek)

Livestock Exclosure Evaluation

On August 16, 1993, Bruce Rich assisted Bureau of Land Management (BLM) personnel in sampling treatment and control sections on Sawmill Creek (Little Lost River) using two backpack electrofishers simultaneously. The sections were set up previously by Idaho Department of Fish and Game (IDFG) and BLM personnel as a long-term study of stream habitat rehabilitation in a blown out section of Sawmill Creek, which has also historically been heavily grazed as a riparian livestock pasture.

Fish Population Surveys

As an adjunct activity to the livestock exclosure evaluation, BLM personnel backpack-electrofished several other stream sections in the Little Lost River drainage.

RESULTS AND DISCUSSION

South Fork Snake River

Fish Population Surveys

Lorenzo-We captured a total of 929 trout in the 1993 sample, a comparable sample to 1991 and larger than our 1988 and 1989 samples (Table 1). The relative abundance of each species group remained essentially identical for the last six survey years in this reach of the South Fork Snake River.

Total abundance and density estimates are summarized in Table 2. Length frequencies for all species are described in Appendix A. Densities of wild cutthroat trout *Oncorhynchus clarki* in 1993 are compared in Table 3 with densities seen during the previous three population estimates. Cutthroat densities in all reported age groups appear similar (Table 3), but again caution is advised for between-year comparisons of age group strength until age-length relationships are better understood. Overall, the 1993 trout population appears to be slightly lower for this reach than in 1991.

Conant Valley-We captured 1,807 trout at least once in the course of four days of sampling (two days marking, two days recapturing). Wild cutthroat trout accounted for 85%, brown trout 9%, and wild rainbow *O. mykiss* and rainbow/cutthroat hybrid trout made up 6% of the total number captured (Table 1). All species were represented in approximately the same proportion in 1993 as in the previous six population surveys. Minor differences are apparent between individual years but are not likely statistically significant.

Table 1. Species composition and relative abundance (%) for new trout captured at Lorenzo and Conant Valley electrofishing sections, South Fork Snake River, 1986-1993.

Location	Date	Number sampled	Relative abundance (%)[a]		
			WCT	BRN	WRB/HYB
Lorenzo	1987	532	39	61	<1
	1988	580	36	63	1
	1989	551	34	66	<1
	1990	765	39	61	<1
	1991	975	37	63	<1
	1993	929	37	62	1
Conant Valley	1986	1,985	84	14	3
	1988	1,787	88	9	3
	1989	2,531	90	7	3
	1990	3,837	86	8	6
	1991	2,054	80	12	7
	1992	719	83	12	5
	1993	1,807	85	9	6

[a] WCT = wild cutthroat trout; BRN = brown trout; WRB = wild rainbow trout; HYB = rainbow x cutthroat trout.

Table 2. Abundance estimates and estimated densities for wild cutthroat and brown trout at Lorenzo and Conant Valley electrofishing sections, South Fork Snake River, 1993.

Section	Species[a]	Size range (TL in mm)	Approximate age	Abundance estimate	95% CI	Density estimate (fish/ha)	95% CI
Lorenzo	WCT	≤111	0	--[b]	--	--	--
		112-253	I	--[c]	--	--	--
		254-334	II	1,128	285-1,971	51	13-89
		≥335	≥III	520	309-731	23	14-33
		≥112	≥I	1,571	959-2,183	71	43-99
	BRN	≤151	0	--[b]	--	--	--
		152-283	I	1,352	814-1,890	61	37-85
		≥284	≥II	944	466-1,422	43	21-64
		≥152	≥I	2,368	1,599-3,137	107	72-142
Conant	WCT	≤111	0	--[b]	--	--	--
		112-253	I	--[c]	--	--	--
		254-334	II	2,388	921-3,855	68	26-110
		≥335	≥III	3,788	3,140-4,436	108	90-127
		≥112	≥I	6,010	4,999-7,022	172	143-200
	BRN	≤151	0	--[b]	--	--	--
		152-283	I	187	74-300	5	2-9
		≥284	≥II	395	138-652	11	4-19
		≥152	≥I	611	312-910	17	9-26

[a] WCT = wild cutthroat trout; BRN = brown trout.
[b] No fish marked and estimate not possible.
[c] Few or no recaps and unbiased estimate not possible.

Table 3. Estimated densities (fish per hectare) of wild cutthroat trout at Lorenzo and Conant Valley electrofishing stations, South Fork Snake River, 1989-1993. Ages are approximate and were not validated.

Sample section	Approximate age	1989	1990	1991	1992[a]	1993
Lorenzo	I	--[b]	--[b]	25	--	--[b]
	II	19	26	60	--	51
	≥III	14	15	17	--	23
	All	33[c]	78[c]	89	--	71[c]
Conant Valley	I	33	181	99	--	--[b]
	II	16	24	41	--	68
	≥III	170	120	70	--	108
	All	215	240	150	--	172

[a] Estimates not made in 1992 due to low flow conditions.
[b] Few or no recaps and unbiased estimate not possible.
[c] Underestimate due to absence of age I+ estimate.

The lower number of trout captured in 1993 than in the three previous sample years (excluding 1992, Table 1) was likely due to higher than usual fall river flows (3,820-2,620 cfs) and less experienced electrofishing crews. We suspect that river discharge may play an important role in influencing the consistency of vulnerability of trout to our sampling gear from year to year. Variable access to side channels may be significant to our ability to sample younger age groups with consistent efficiency from year to year.

Total abundance and density estimates are summarized in Table 2. Length frequencies for all species are described in Appendix A. Densities of wild cutthroat trout in 1993 are compared with densities seen during the previous three population estimates in Table 3. Densities of all cutthroat age groups increased from the 1991 low of 150/ha to 172/ha. Those increases were also reflected for age 2+ cutthroat and cutthroat 3+ and older. The large increase in densities of age 2+ cutthroat may indicate improving survival and recruitment following improved winter flow conditions for the previous two winters ($\geq$1,200 cfs minimum winter flow). However, caution should be used in comparisons of 1993 age group estimates with previous years' estimates. Close examination of 1993 length frequencies and preliminary aging of scale samples indicate that length-age relationships reported in previous reports may not agree with 1993 findings. We will evaluate aging data and electrofishing efficiency curves further to standardize our multi-year South Fork database. This will be discussed in greater detail in future reports.

Brown Trout Redd Survey

We counted 424 brown trout redds from the afterbay of Palisades Dam to the confluence of the South Fork and Henrys Fork Snake Rivers (Table 4), a 48 percent decline from our 1991 total count. The 1991 count was the highest on record since we have conducted aerial brown trout redd counts. Our counts have ranged from 271 to 889 for this river reach. Variable weather conditions, visibility, and brown trout spawning activity probably accounts for much of this variation. Nonetheless, the 1993 count was the lowest since 1985. Special attention will be

Table 4. Brown trout redd counts on the South Fork Snake River, 1982 to present.

Location	Distance (km)	12/8 1982	12/20 1983[a]	12/4 1984	12/10 1985	12/5 1986	12/4 1987[b]	12/5 1988	12/18 1989[c]	12/7 1990	12/9 1991	1992[d]	12/13 1993
Afterbay of Palisades	0.8	90	49	75	179	294	70	199	117	168	111	--	40
Afterbay-Irwin	11.2	0	0	51	143	29	2	15	0	7	0	--	0
Irwin-Conant Valley	15.8	4	4	8	65	46	103	8	106	12	207	--	126
Conant-Burns Creek	16.2	120	96	37	143	311	133	216	215	171	216	--	55
Burns Creek-Anderson Diversion	20.6	57	9	51	8	62	47	39	61	127	141	--	88
Anderson-Heise Bridge	5.6	0	0	7	5	0	7	2	0	0	0	--	0
Heise Bridge-Mouth	30.4	NC	NC	23	65	67	168	66	75	81	214	--	115
Total	100.6	271	154	252	608	809	530	545	574	566	889	--	424

[a] Counts should be considered low due to poor visibility from fog. NC = not counted.

[b] Later flights indicated fish spawned later in 1987 than in previous years. On December 14 in the afterbay, 105 redds were counted versus 70 on December 4.

[c] Late counts due to weather conditions. Fog at dam, ice below Lorenzo.

[d] Not done in 1992 due to weather conditions.

given to the 1994 aerial count to help determine if a trend in declining brown trout spawning activity is developing.

Henrys Fork of the Snake River

Fish Population Surveys

Big Springs to Macks Inn Reach-The predominant wild trout/char species sampled were brook trout *Salvelinus fontinalis* (N = 536) and rainbow trout (N = 232). Wild rainbow trout were mostly <200 mm TL, and analysis of scales indicated only moderate growth rates compared to other Idaho stream populations and much slower than in the Box Canyon of the Henrys Fork (Figure 1, Table 5). Brook trout had a similar size distribution (Figure 2), but preliminary scale analysis indicates their growth may be on the high end of the scale for the region. The truncated length frequency distributions for both species indicate most wild brook and rainbow trout leave this reach before they attain 300 mm TL, either by migrating downstream or as a result of angler harvest. More work is warranted on this reach to evaluate the fishery and available habitat.

Box Canyon Reach-Over 1,000 fish were handled in this effort, 85% of which were rainbow trout, 5% brook trout and 10% mountain whitefish *Prosopium williamsoni*. The number of whitefish sampled could easily have equaled that of rainbow trout had we not stopped netting them after the first day to increase our efficiency at capturing trout. Our population estimate for all trout (95% rainbow trout) was 11,325 P(5,003 <=N <=17,647) = 0.95. This represents a change in what had been a long term decline from a high of 18,800 to a period low of 3,200 in 1991 (an 85% decline through the period) (Figure 3). This sudden improvement in the population size was likely due to emigration of hatchery origin rainbow trout from Island Park Reservoir into the Box Canyon reach during the drastic drawdown of the reservoir in fall 1992.

The length frequency distribution of wild rainbow trout in the Box Canyon reach shows a distribution of fish up into the 600 mm range, but there is a relative paucity of fish in the 150-250 mm range (Figure 4). This could be due to poor first overwinter survival of the 1992 cohort or to artificially high numbers of larger fish buoyed up by emigration from the reservoir. Scale samples were collected and pressed from a stratified sample of wild rainbow trout but as of this writing have not yet been read for age and growth determination. Those determinations, when made, should help explain the relative scarcity of intermediate size rainbow trout in the Box Canyon reach.

More information from the Box Canyon reach is presented in Appendix B.

Buffalo River-Species captured by electrofishing on the Buffalo River included wild rainbow trout, hatchery catchable rainbow trout, Colorado River rainbow trout (which were released as fingerlings), redside shiners *Richardsonius balteatus*, sculpin *Cottus* spp., dace *Rhinichthys* spp. and brook trout. So few trout >150 mm were captured and marked that no recapture effort was made. Fish habitat in this reach consisted almost exclusively of trees that the US Forest Service (USFS) anchored to the banks as instream habitat enhancement structures. Wild rainbow trout represented 55% (n=60) of the trout in the catch but were almost

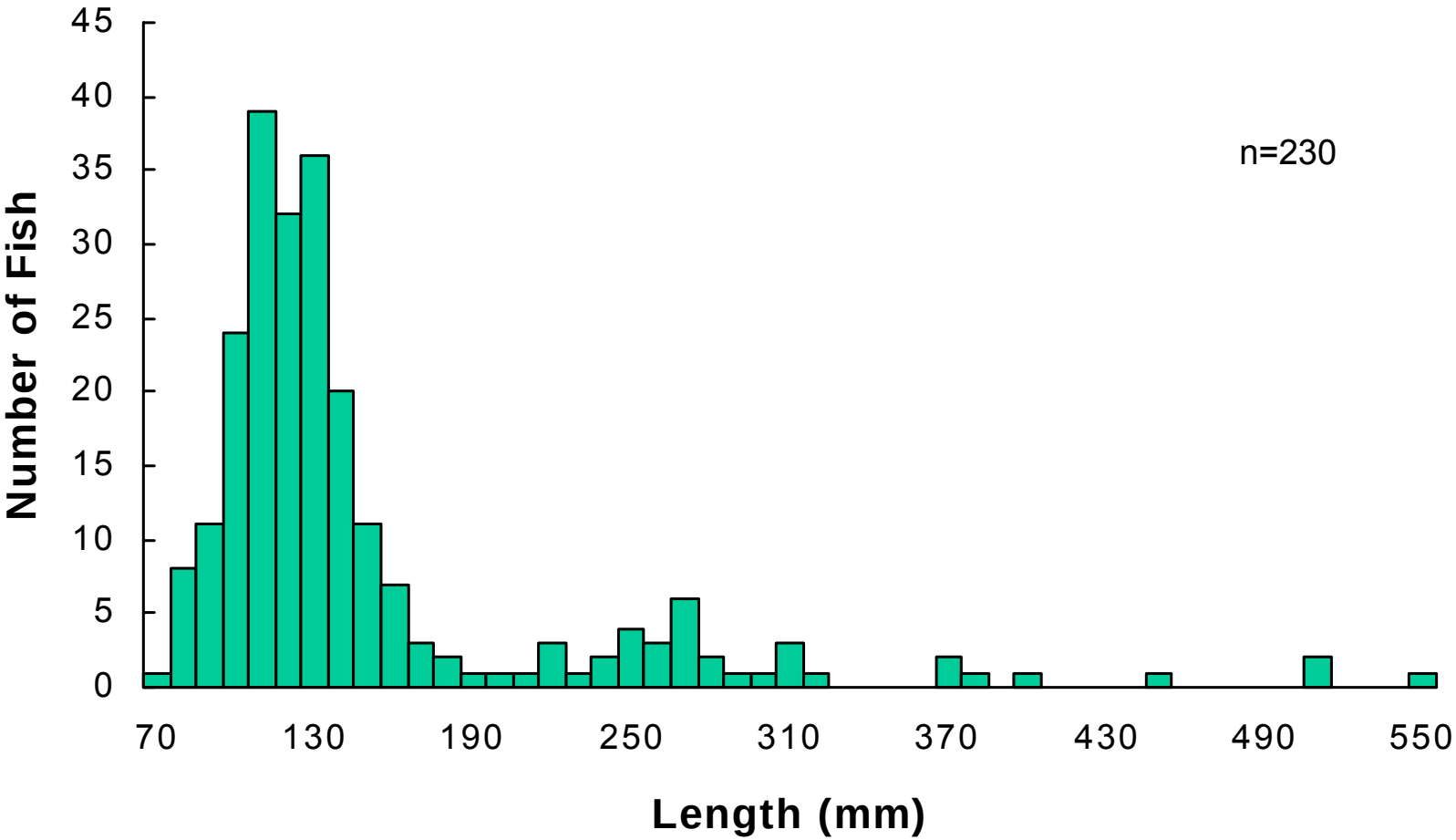


Figure 1. Length frequency of rainbow trout in the Henrys Fork Snake River, Big Springs to Mack's Inn, 1993.

Table 5. Average back-calculated lengths for each age class of rainbow trout in the Henrys Fork Snake River, Big Springs to Mack's Inn, 1993.

			Back-calculation age				
Year class	Age	N	1	2	3	4	5
1992	I	15	100.19				
1991	II	14	113.94	184.68			
1990	III	15	117.61	196.12	263.83		
1989	IV	5	106.45	165.17	236.55	281.25	
1988	V	1	146.79	256.22	347.19	436.81	501.89
	All classes		110.82	188.84	261.31	307.17	501.89
N		76	50	35	21	6	1

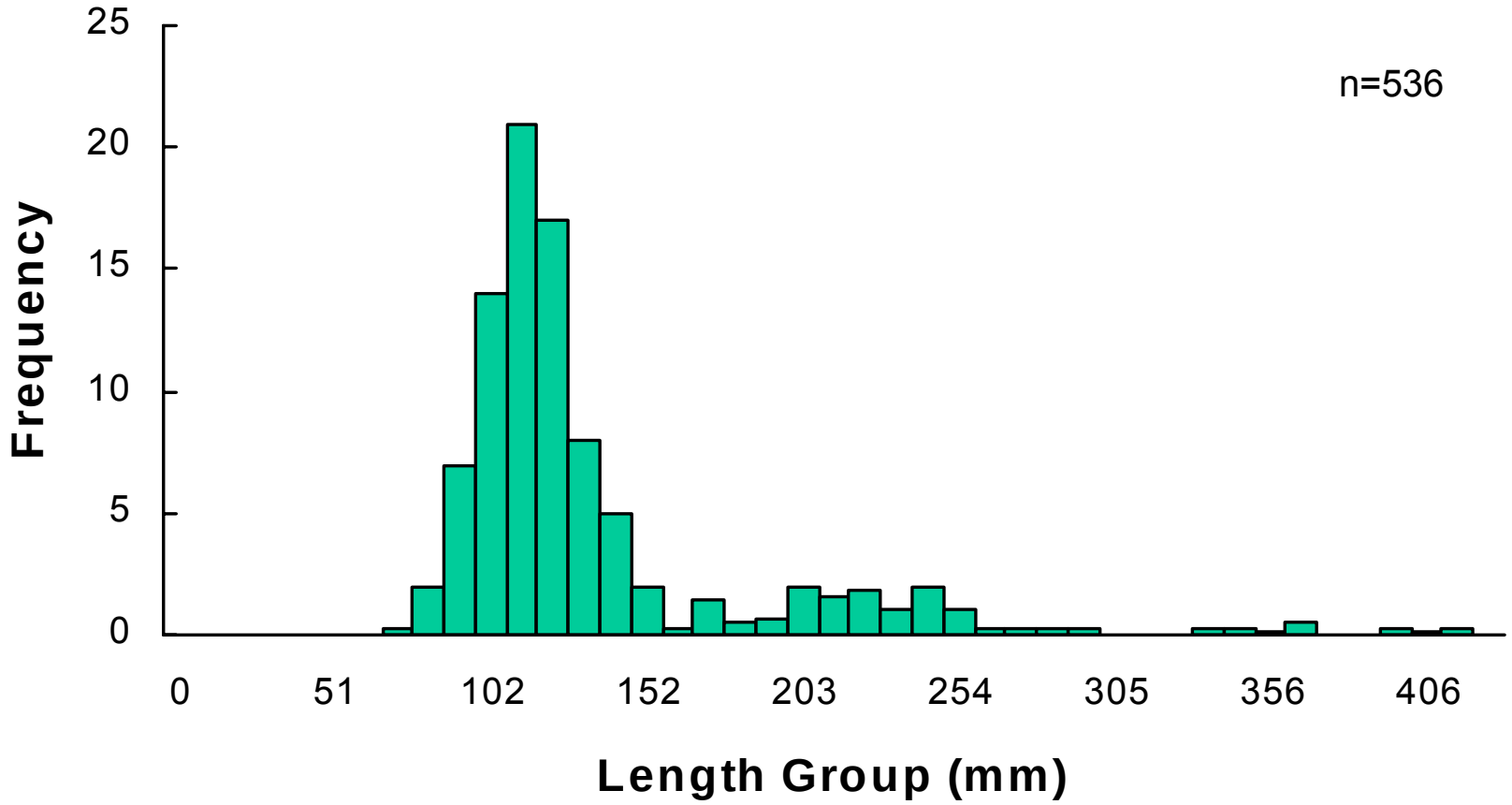


Figure 2. Length frequency of brook trout in the Henrys Fork Snake River at Mack's Inn, 1993.

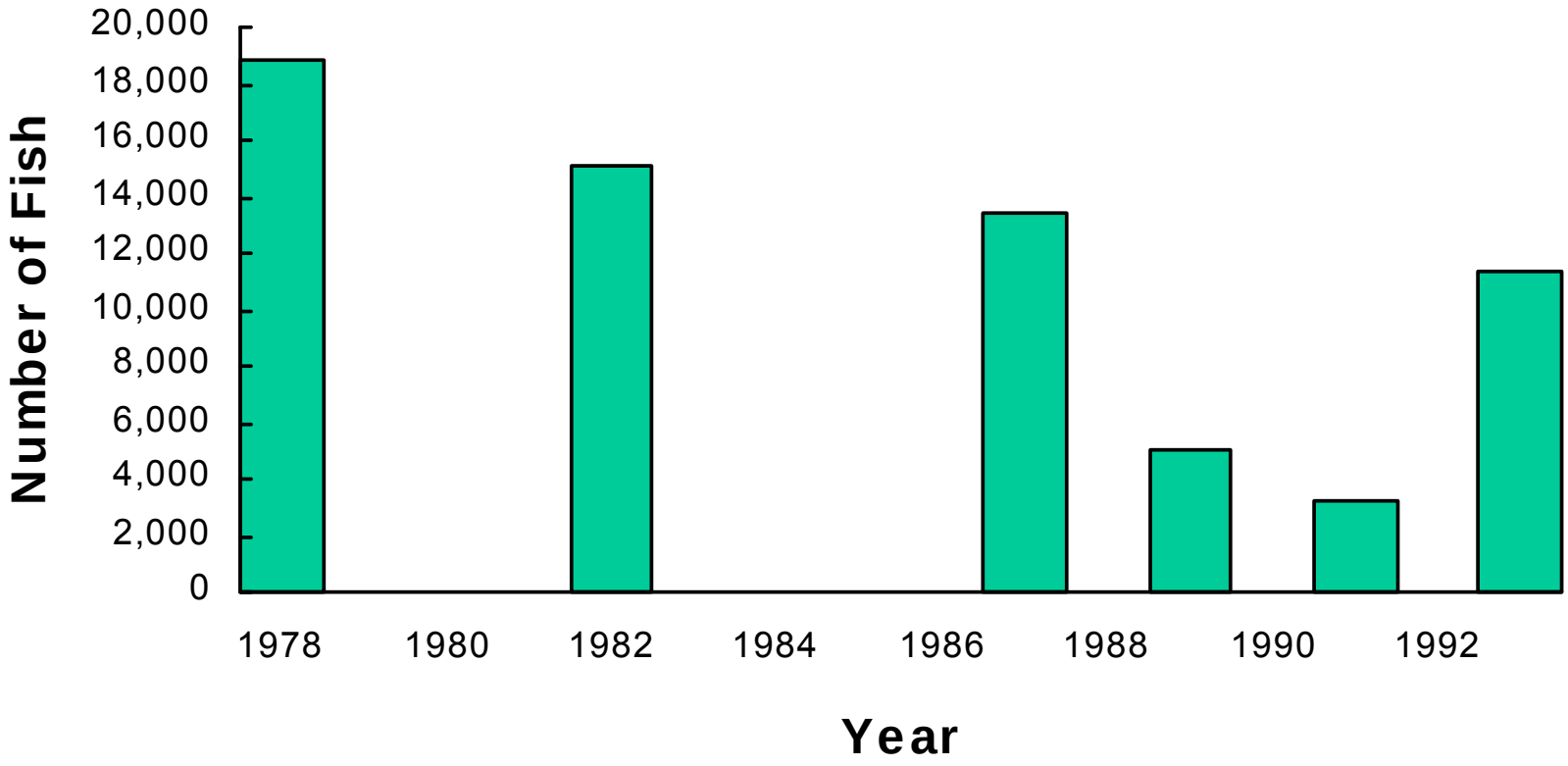


Figure 3. Population estimates of rainbow trout in Box Canyon, 1978-1993.

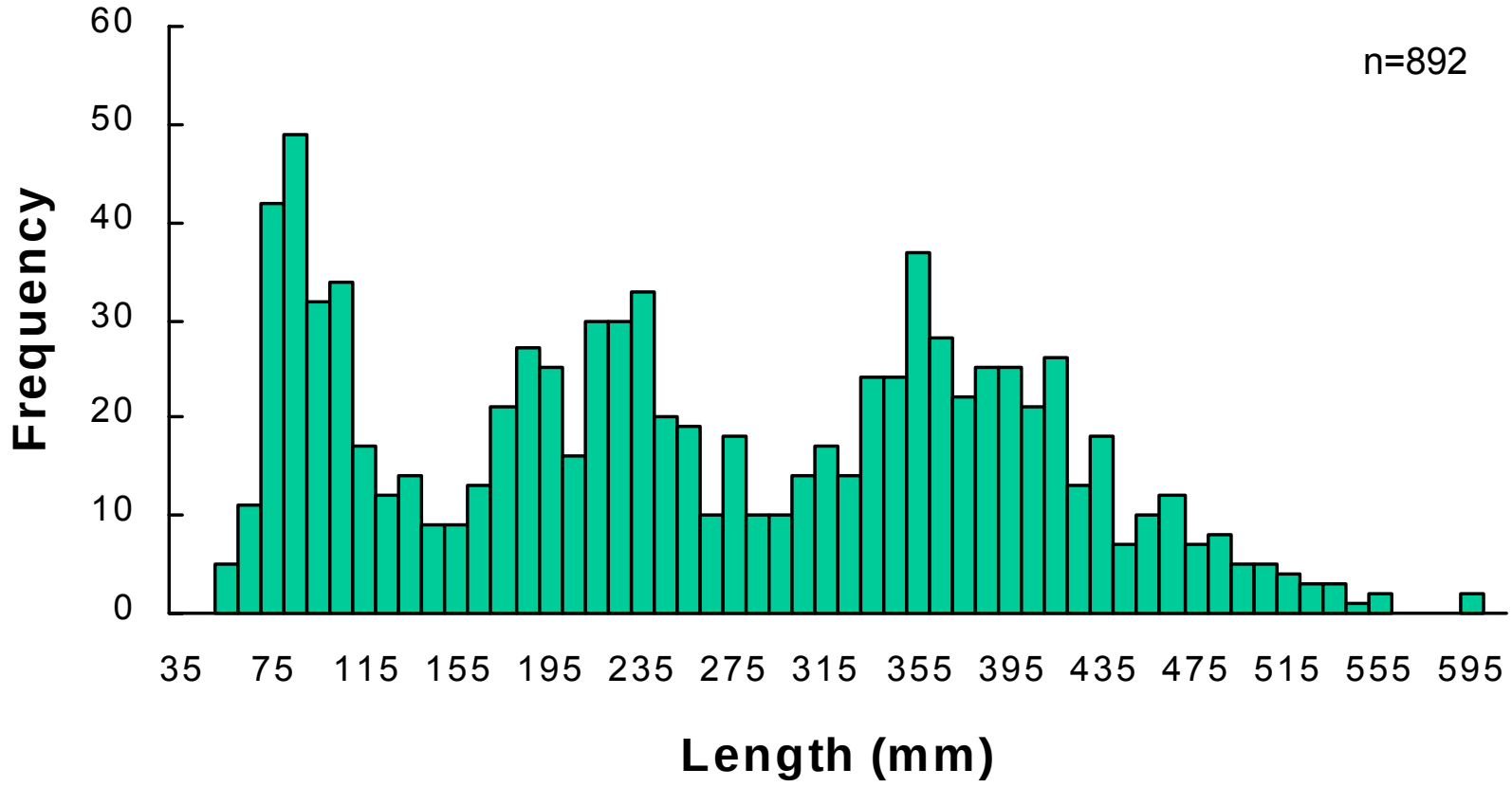


Figure 4. Length frequency of rainbow trout in Box Canyon, August 1993.

all young-of-year with the exception of a few larger fish found mostly in shaded deep water at the very downstream end of the reach. The rest of the wild trout in the sample were 37% brook trout (n=41) and 8% Colorado River rainbow trout (adipose clipped fish released as fingerlings).

Little Lost River (Sawmill Creek)

Livestock Exclosure Evaluation

Trout and char numbers were similar or declined from 1987 in the study sections, although habitat appeared to have remained static or improved, some of it significantly. Two suggested causes for this decline might be prolonged severe drought during the period and/or angler harvest. Complete results of this sampling are presented in Appendix C.

Fish Population Surveys

BLM personnel backpack-electrofished several other stream sections in the Little Lost River drainage. Overall numbers of all trout and char species were down drastically compared to the last survey in 1987, although the habitat was in good condition and not significantly different than when last surveyed. Two suggested causes for this decline might be prolonged severe drought during the period and/or angler harvest. Complete results of this sampling are presented in Appendix D.

RECOMMENDATIONS

South Fork Snake River

1. Continue annual population estimates for Conant Valley and Lorenzo reaches.
2. Continue annual brown trout aerial redd survey.
3. Add population estimate at Palisades reach to evaluate status of wild rainbow, rainbow/cutthroat hybrid, and brown trout populations.

Henrys Fork Snake River

1. Repeat population estimate for Box Canyon reach to continue status evaluation of wild and reservoir/hatchery rainbow trout evaluation.
2. Conduct population estimate or Pinehaven-Riverside reach.
3. Continue habitat and production capability assessments for Henrys Fork above Island Park Reservoir.
4. Monitor spawning escapement of rainbow trout from Island Park Reservoir to upper Henrys Fork via spring aerial redd counts.

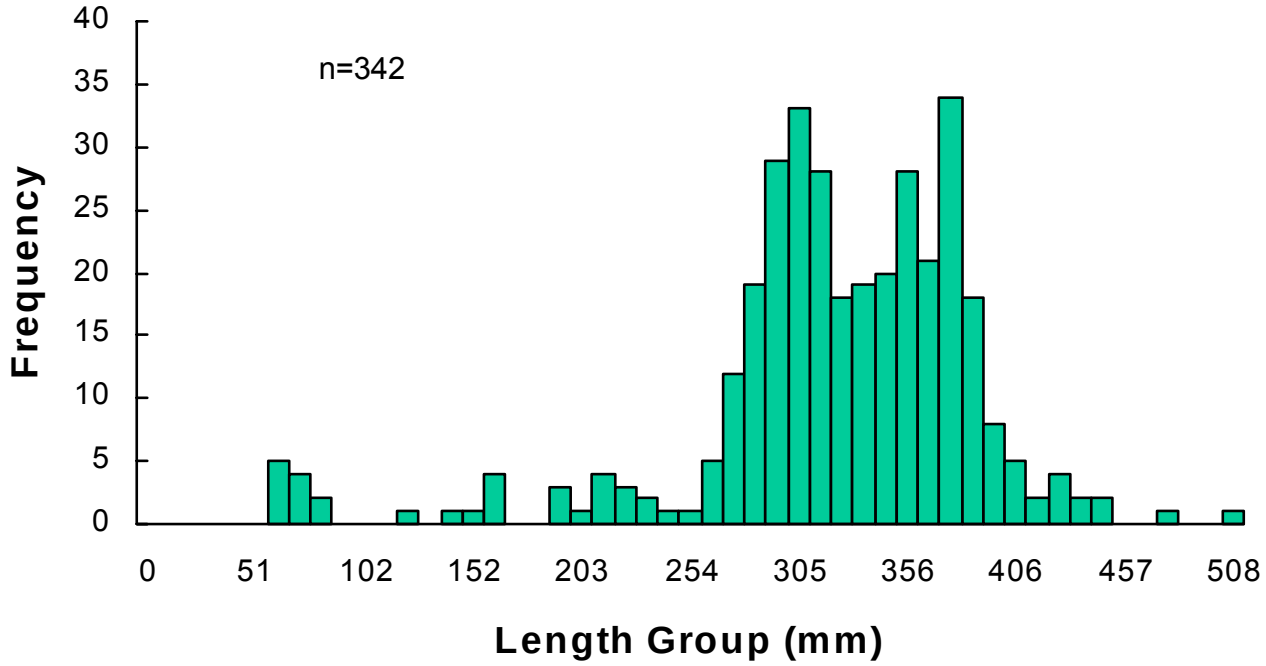
LITERATURE CITED

Elle, S., and M. Gamblin. 1993. Regional fisheries management investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, 1990 Job Performance Report, Project F-71-R-15, Boise.

APPENDICES

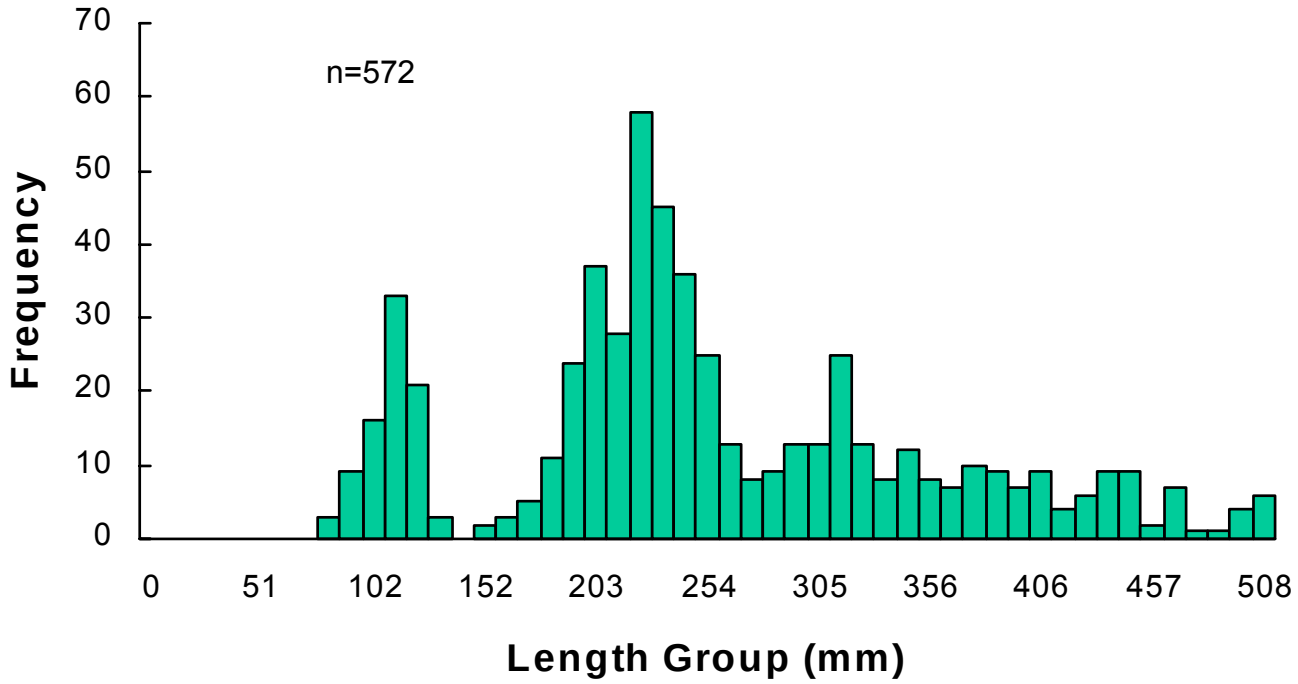
Appendix A. Length frequencies of trout sampled in the South Fork Snake River, 1993.

Lorenzo 1993
Wild Cutthroat Trout



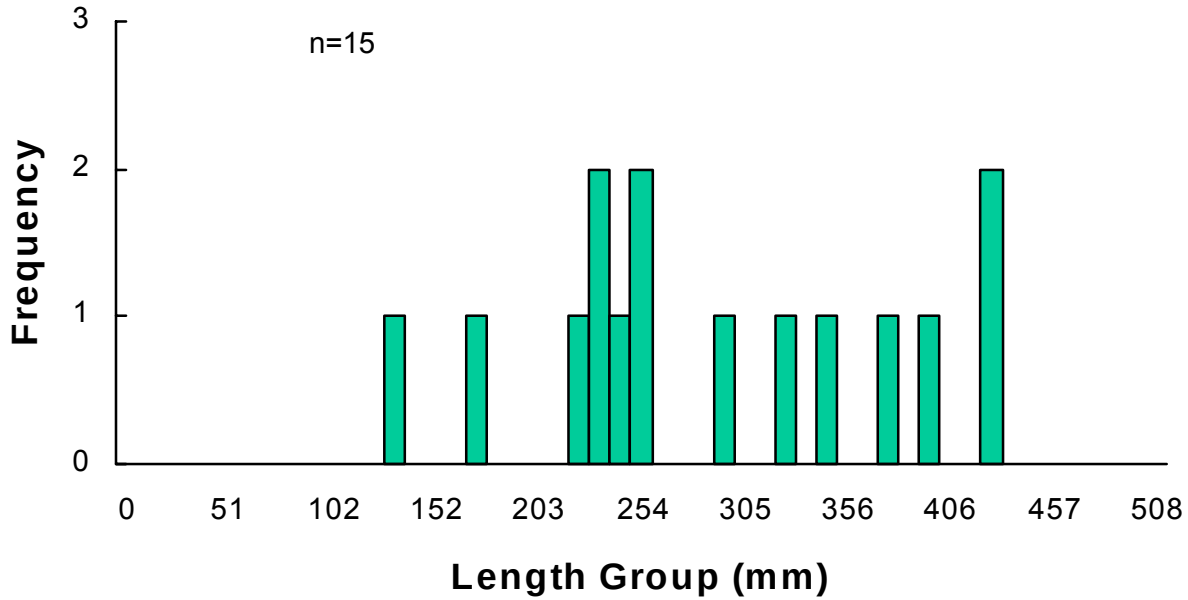
Appendix A-01

Lorenzo 1993
Wild Brown Trout



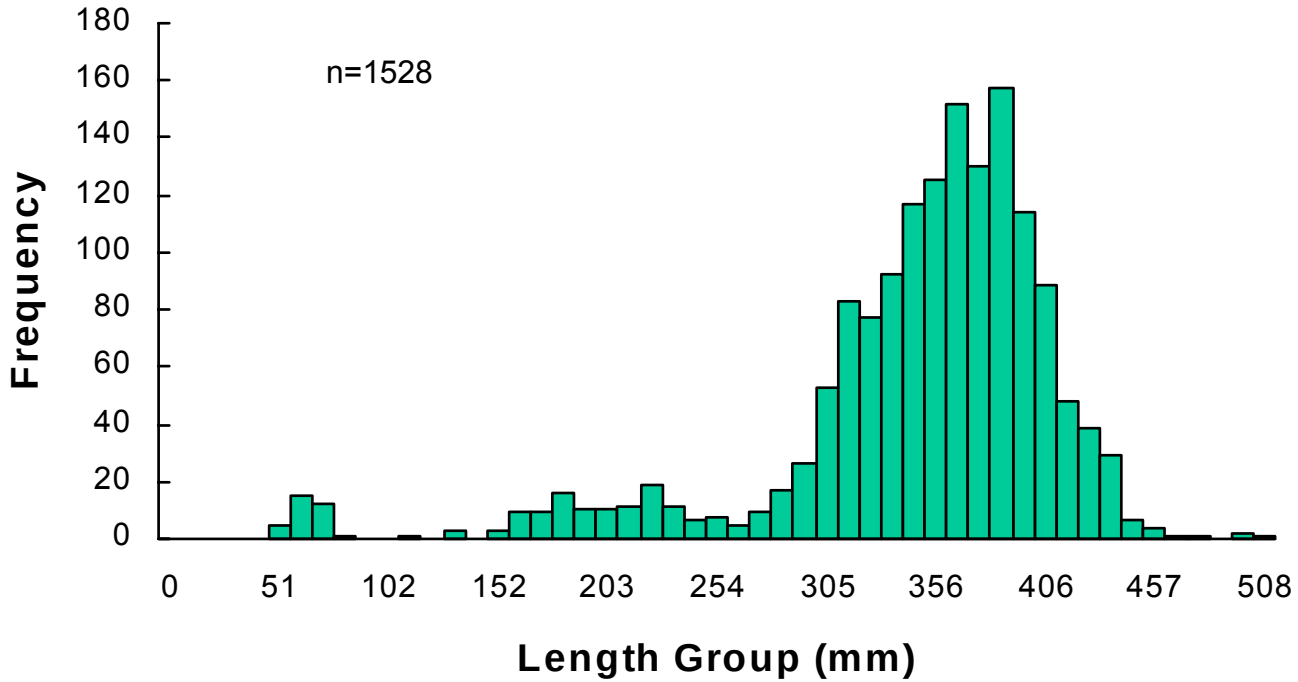
Appendix A-02

Lorenzo 1993
Wild Rainbow & Hybrid Trout



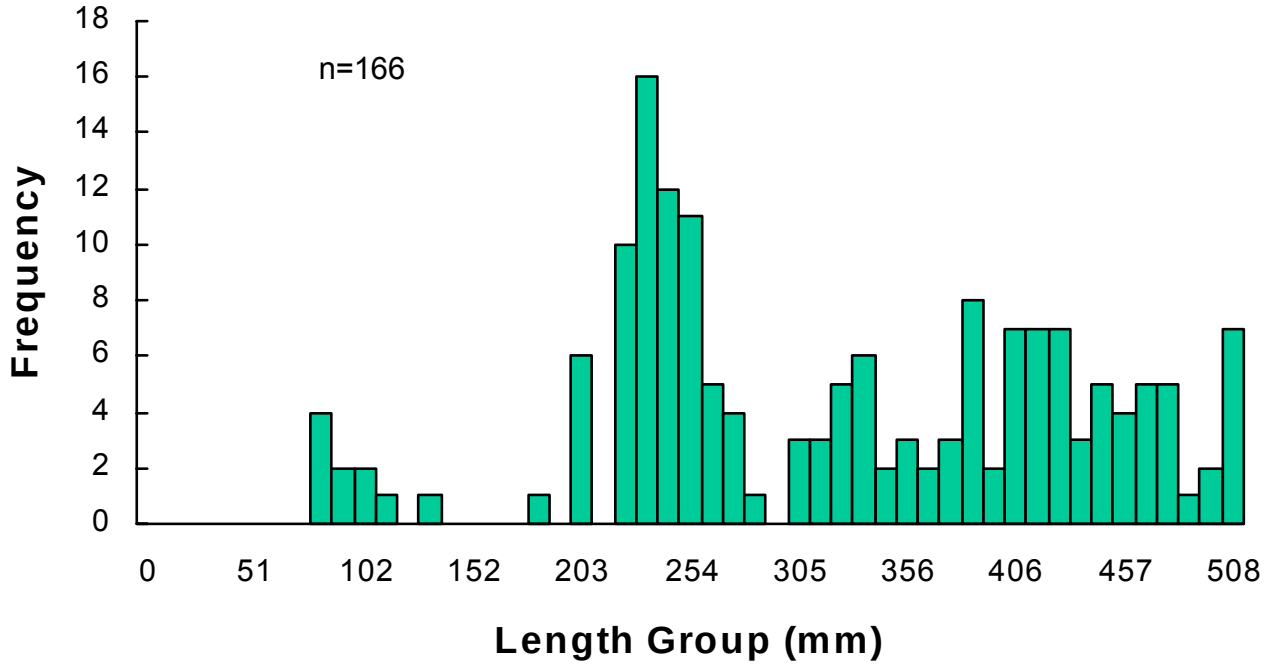
Appendix A-03

Conant 1993
Wild Cutthroat Trout



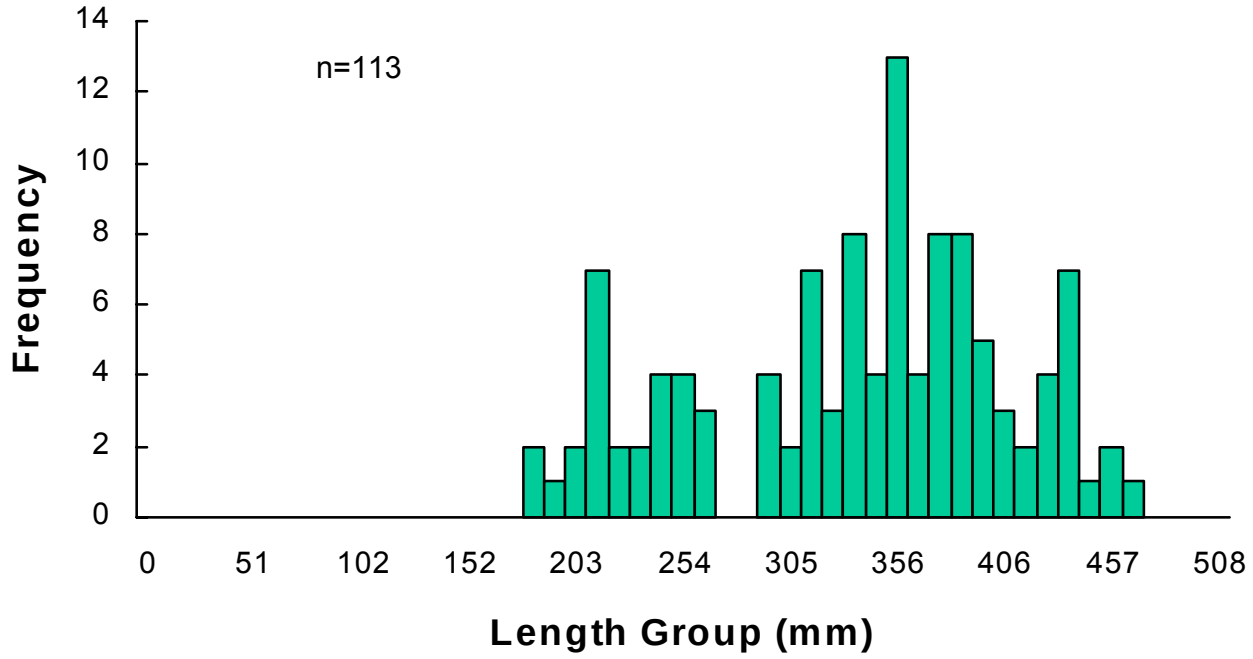
Appendix A-04

Conant 1993
Wild Brown Trout



Appendix A-05

Conant 1993
Wild Rainbow & Hybrid Trout



Appendix A-06

Appendix B. Summary of mark-recaptured data and length frequencies of sampled fish in Box Canyon, August 1993.

Henrys Fork Box Canyon Summary Statistics

Total fish handled = 1,098 (+ 1 chub not entered)

WRB =	915	(83%--includes 5 hybrids)
HRB =	21	(2%--includes 1 hybrid)
EBT =	51	(5%)
MWF =	111	(10%)

Size ranges {TL in mm)

WRB =	54-623 mm
HRB =	152-518 mm
EBT =	125-314 mm
MWF =	70-557 mm

See attached sheets for Length Frequency Distributions.

Population estimates for trout ~150 mm (includes WRB, HRB, EBT):

M = 300 (UC marks only, 8/5 to 8/20/93)
(186 trout <1 50 mm were also captured but not marked)

C = 453 (8/24 to 8/26--41 trout <150 were also captured but not marked)
(includes 4 LC recaps)

R = 12 (UC recaps of 8/24 to 8/26 only)

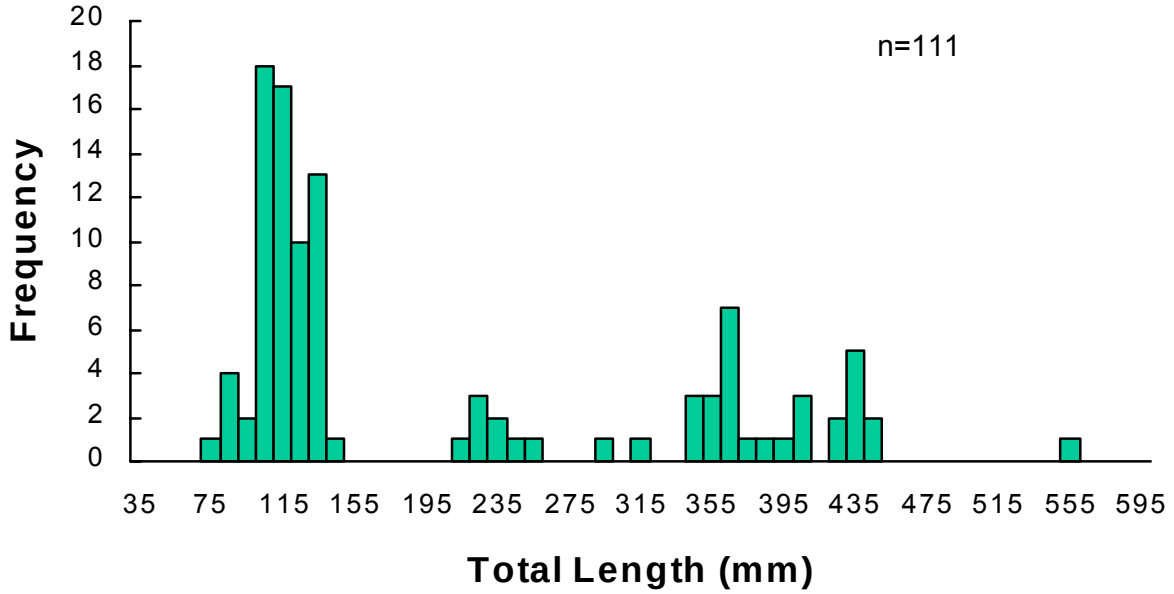
N = MC/R (300) (453) /12 = 11,325 trout $\geq$150 mm

$V(N) - M^2C(C-R)/R^3 = 10,404,843.75$

$N \pm 1.96\ V(N) = 11,325 \pm 6,322$

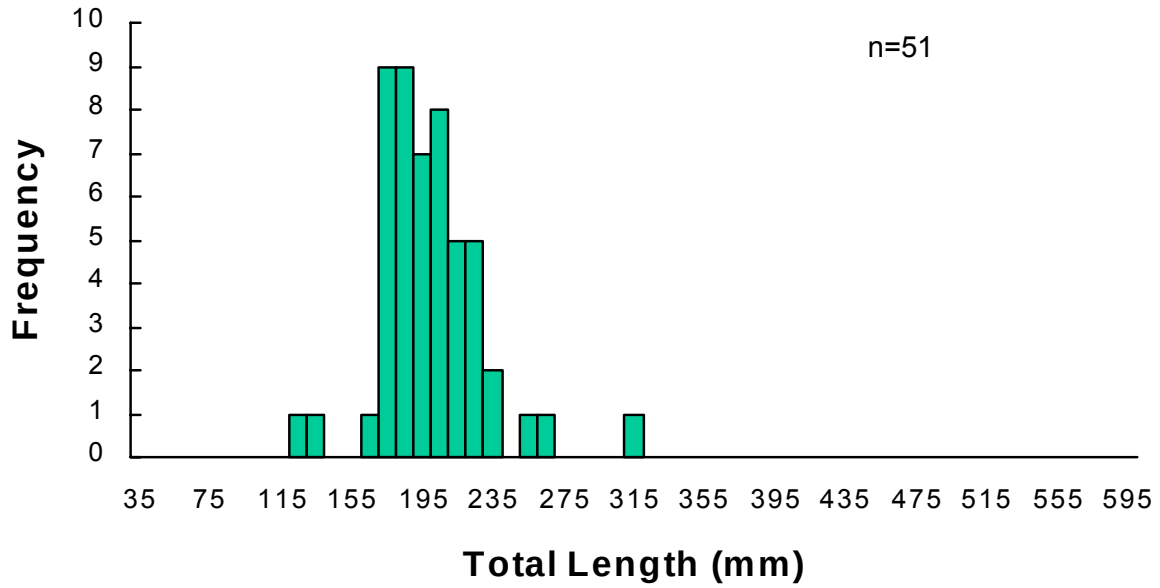
$P(5003 \leq N \leq 17,647) = 0.95$

Henry's Fork Box Canyon - August, 1993
Mountain Whitefish



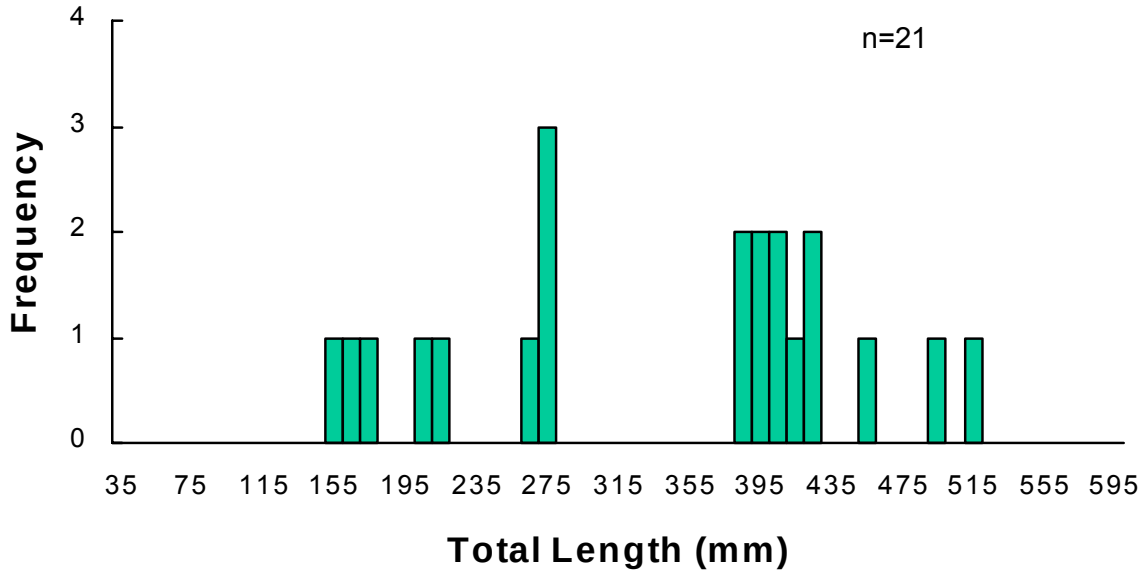
Appendix B-01

Henry's Fork Box Canyon - August, 1993
Eastern Brook Trout



Appendix B-02

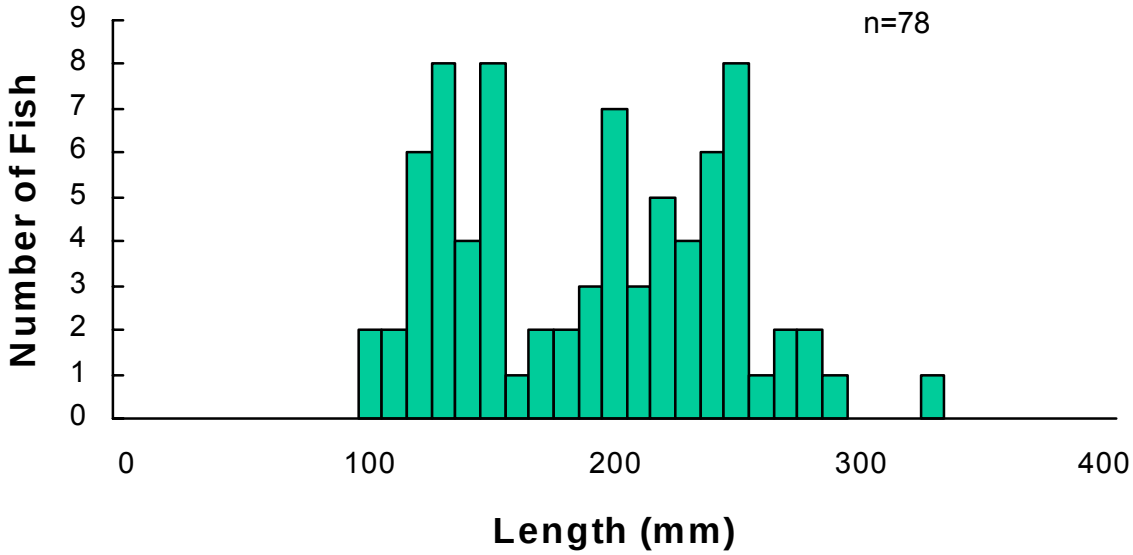
Henry's Fork Box Canyon - August, 1993
Hatchery Rainbow Trout



Appendix B-03

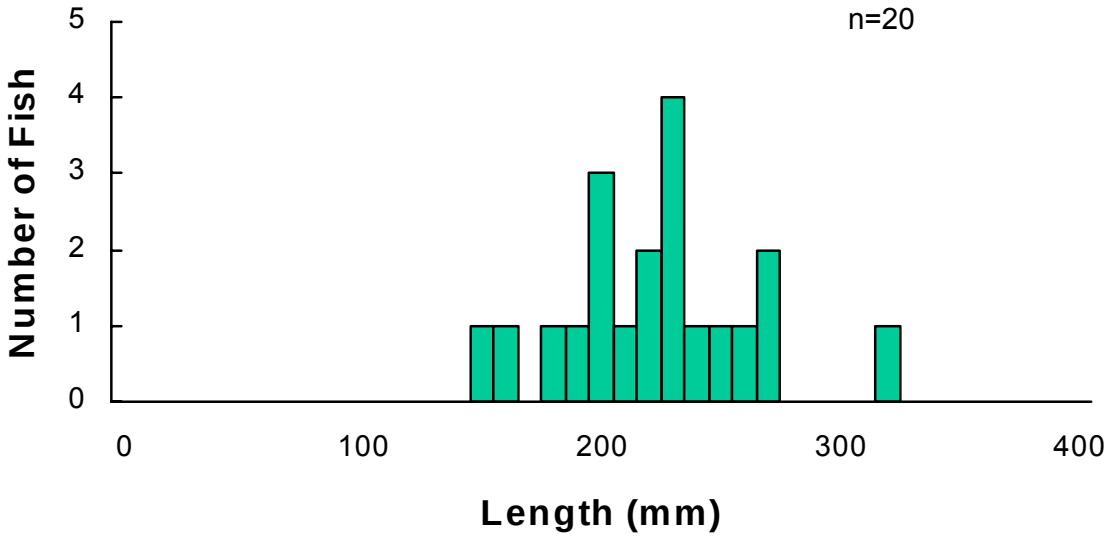
Appendix C. Length frequencies of trout sampled in various sections of Sawmill Creek, August, 1993.

Sawmill Creek-Upper Pasture
Wild Rainbow Trout, 1993



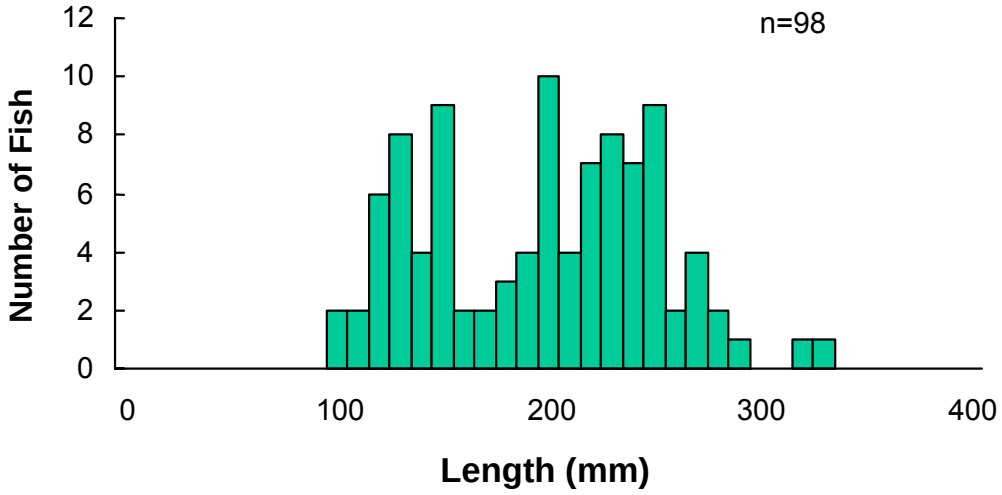
Appendix C. Sites 1 and 2.

Sawmill Creek-Lower Pasture
Wild Rainbow Trout, 1993



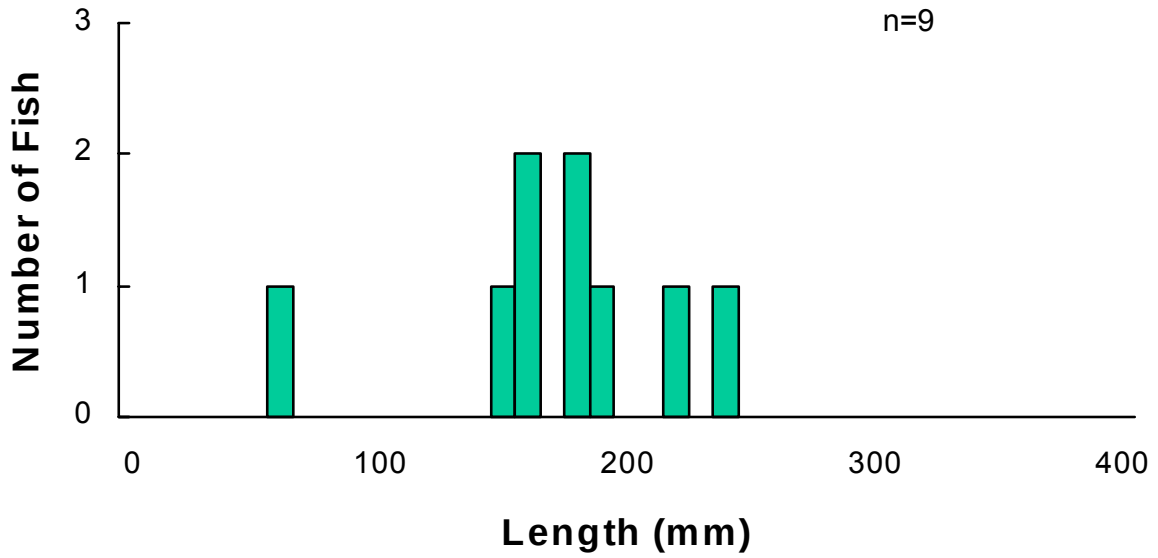
Appendix C. Sites 3 and 4.

Sawmill Creek-Upper & Lower Pasture
Wild Rainbow Trout, 1993



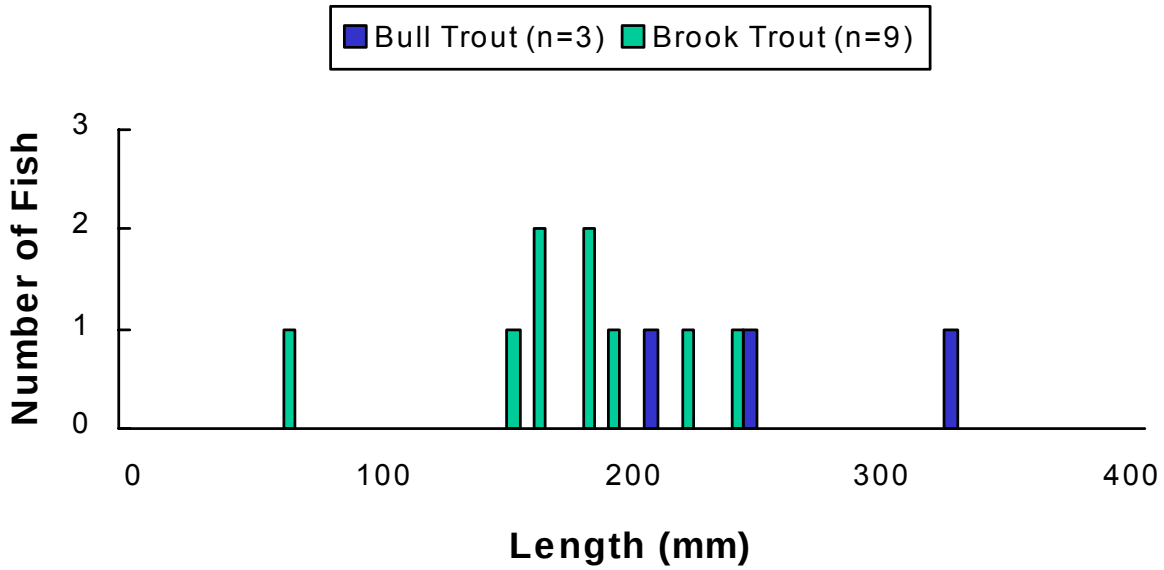
Appendix C. Sites 1, 2, 3, and 4.

Sawmill Creek-Upper & Lower Pasture
Brook Trout, 1993



Appendix C. Sites 1, 2, 3, and 4.

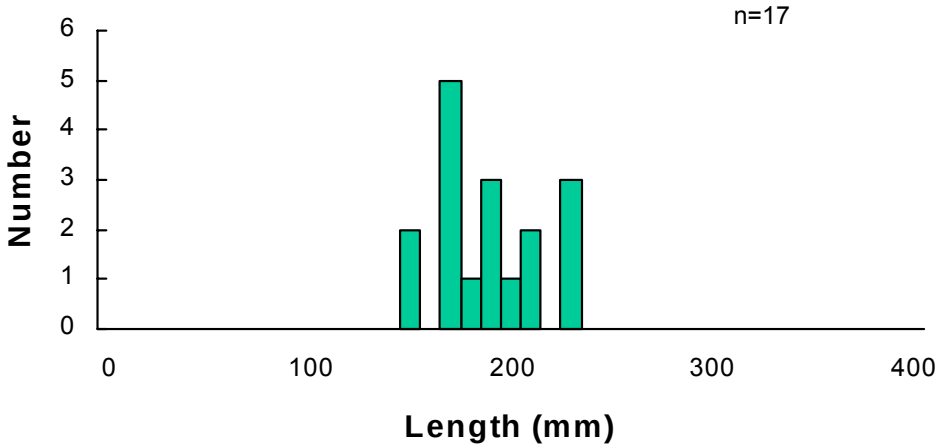
Sawmill Creek-Upper & Lower Pasture
Bull Trout & Brook Trout, 1993



Appendix C. Sites 1, 2, 3, and 4.

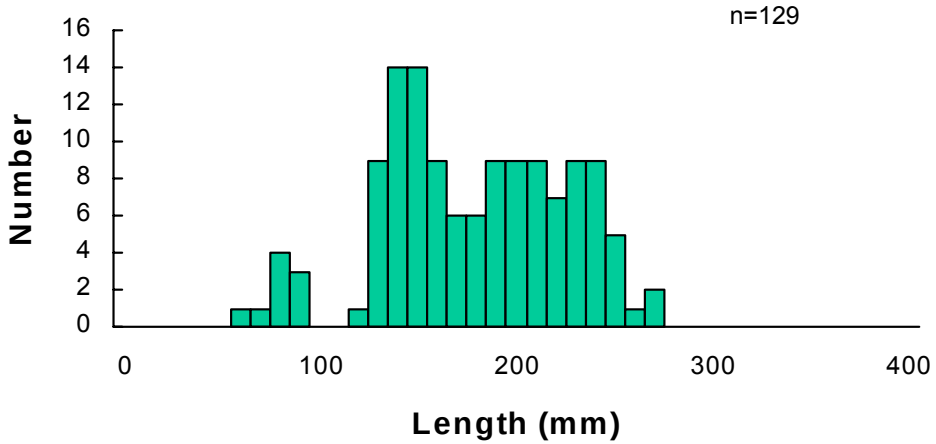
Appendix D. Length frequencies of fish sampled in various Little Lost River drainage streams, 1993.

Little Lost River Below Wet Creek
Wild Rainbow Trout, 1993



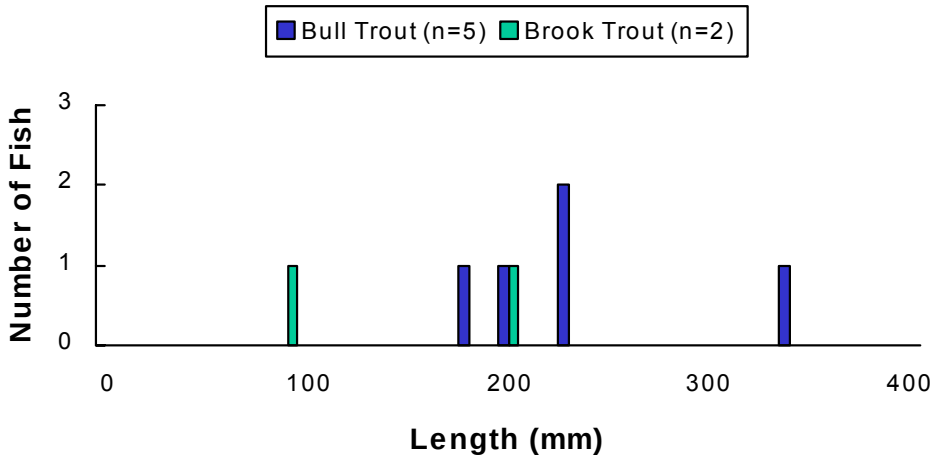
Appendix D. Sites 1 and 2. Site 1 is below Big Springs Creek and Site 2 is below Badger Creek.

Little Lost River Above Wet Creek
Clyde Campground
Wild Rainbow Trout, 1993



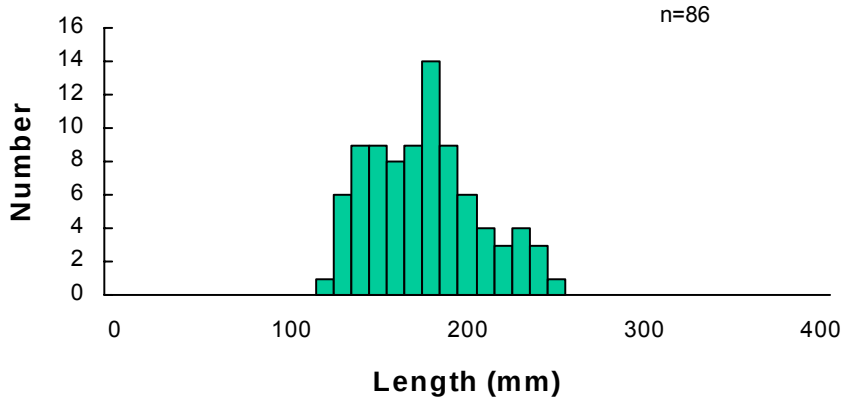
Appendix D. Site 3.

Little Lost River
Bull Trout & Brook Trout, 1993



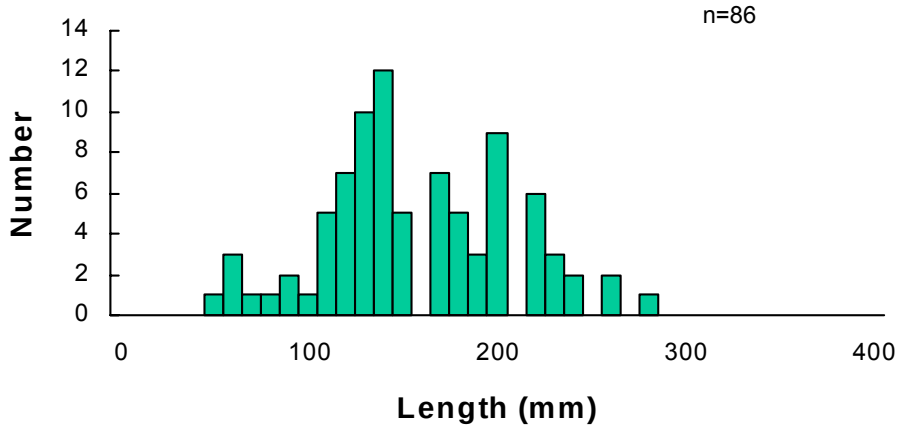
Appendix D. Sites 1, 2, and 3.

Warm Springs Creek Below Highway Crossing
Little Lost River Drainage
Wild Rainbow Trout, 1993



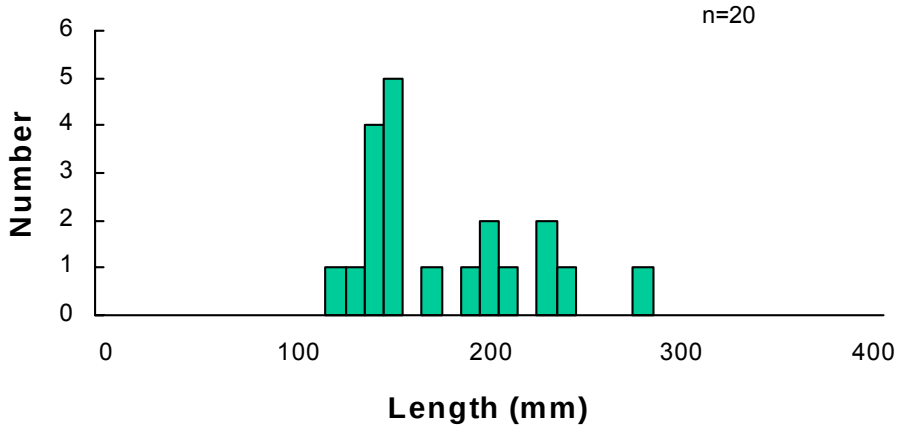
Appendix D.

Big Springs Creek, 0.5 mi Above Bridge
Little Lost River Drainage
Wild Rainbow Trout, 1993



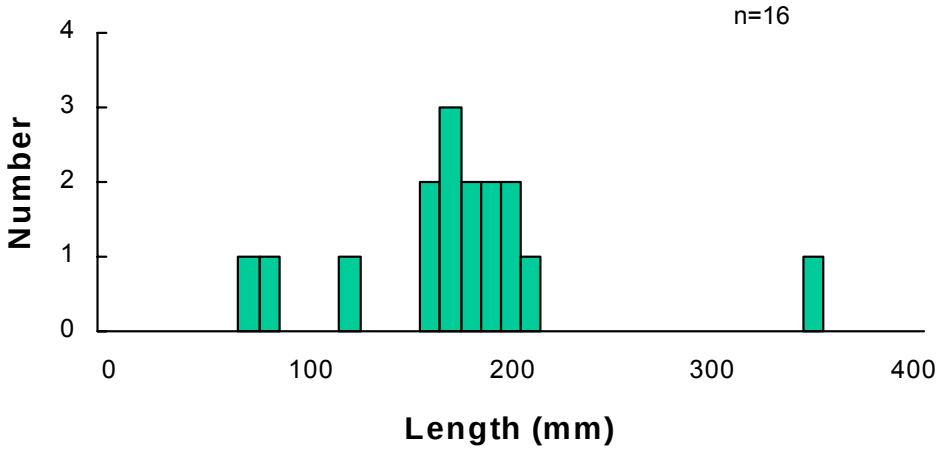
Appendix D.

Big Springs Creek, 0.5 mi Above Bridge
Little Lost River Drainage
Brook Trout, 1993



Appendix D.

Fallert Springs Creek at Bridge
Little Lost River Drainage
Rainbow Trout, 1993



Appendix D.

1993 ANNUAL PERFORMANCE REPORT

State of: Idaho Program: Fisheries Management F-71-R-18

Project II: Technical Guidance Subproject II-G: Upper Snake Region

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

Technical assistance was provided to federal, state and local agencies upon request. Technical assistance was also provided to sporting clubs for habitat enhancement and related conservation projects, conservation organizations for educational programs and grant application reviews, and to private citizens for private fish pond stocking and development.

Author:

Mark Gamblin
Regional Fishery Manager

METHODS

We responded to requests for data, project reviews and recommendations from private citizens, government agencies, sporting clubs and conservation organizations. We conducted field inspections and attended meetings. We also provided verbal and written responses when necessary. These tasks were coordinated or jointly accomplished with Bob Martin, Regional Environmental Staff Biologist.

RESULTS AND DISCUSSION

During 1993 we responded to requests from the following entities for technical assistance on fishery resource related issues:

US Army Corps of Engineers
US Bureau of Land Management
US Bureau of Reclamation
US Environmental Protection Agency
Federal Energy Regulatory Commission
Idaho Department of Health and Welfare, Division of Environmental Quality
Idaho Department of Lands
Idaho Department of Transportation
Idaho Department of Water Resources
Idaho Water Resource Board
Idaho Outfitters and Guides Board
Private fish ponds
U.S. Fish and Wildlife Service
U.S. Forest Service
U.S. Soil Conservation Service
Trout Unlimited
Federal of Fly Fishers
Eagle Rock Bass Masters
Henrys Lake Foundation
Henrys Fork Foundation

1993 ANNUAL PERFORMANCE REPORT

State of: Idaho Program: Fisheries Management F-71-R-18

Project III: Habitat Management Subproject III-G: Upper Snake Region

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

Region 6 fisheries personnel facilitated and carried out habitat improvement projects on Henrys Lake, Henrys Fork Snake River, and Palisades Creek (tributary to the South Fork Snake River).

Approximately 4.5 miles of riparian fence were constructed or rebuilt on Henrys Lake tributaries. A wetland enhancement project was initiated via water control structures adjacent to Targhee Creek, tributary to Henrys Lake.

Additional riparian fence was installed on the southeast shore of Henrys Lake to exclude cattle grazing.

A shore based helixor aeration system was placed off the Henrys Lake hatchery to boost winter dissolved oxygen concentrations and protect the Henrys Lake cutthroat trout hatchery spawning run.

An experimental sediment removal project, post-1992 Island Park Reservoir drawdown, for the Last Chance reach of the Henrys Fork Snake River was facilitated through the auspices of the Henrys Fork Watershed Council. Available equipment and techniques proved unsuited to the requirements of sediment removal within regulatory agency environmental permitting constraints.

Placement and construction of a large scale, permanent fish screen for Palisades Creek, tributary to the South Fork Snake River, was completed in 1993 by the US Bureau of Reclamation with the assistance of Region 6 IDFG personnel.

Authors:

Mark Gamblin
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Tom Herron
Regional Fishery Biologist

Bruce Rich
Regional Fishery Biologist

INTRODUCTION AND METHODS

Henrys Lake

Riparian Fencing

Buck and pole timber fence was constructed in a cooperative project with the US Bureau of Land Management (BLM) and the Idaho Department of Lands to exclude grazing cattle from the cliff area of the southeast shore of Henrys Lake. Department personnel provided assistance with road grading and reconstruction and drainage culvert placement.

On the south shore of Henrys Lake approximately 3.5 miles of electric fence was installed to protect the shoreline from degradation by cattle. Riparian fencing was installed on the lower half mile of Duck Creek to aid bank stabilization and reduce sediment load.

The riparian fence along Howard Creek was rebuilt to incorporate insultimbers and improve power output.

The riparian fence on upper Duck Creek was rebuilt and an extra water crossing was installed.

Wetland Habitat

Habitat projects in 1992 included completion of a wetland enhancement on the Slash E Ranch adjacent to Targhee Creek, which consisted of construction of a 150-yard dike and installation of an outlet structure to raise the water level.

Winter Aeration System

A shore based lake helixing system with 12 helixing cylinders placed on the lake bottom off the hatchery was installed to aid winter aeration during times of severe oxygen depletion.

The installation was accomplished by a crew of 15 to 20 Idaho Department of Fish and Game (IDFG) personnel, reservists and volunteers. They worked from a 21-foot purse seine barge and two to three powerboats to position 12 separate 2-inch diameter high density polyethylene airlines in a gridded circle 50 acres in area. Each airline was anchored with solid concrete blocks at 10-foot intervals. The entire aeration system is supplied by two independent, semi-permanently affixed heavy duty 20 HP air blowers. This aeration system was designed specifically for Henrys Lake by POLCON Corp., Vancouver, B.C., to effectively treat 200 acres of Henrys Lake.

Henrys Fork Snake River

Sediment Removal Efforts

Spring Flushing Flows-In March 1993 high flows were released from Island Park Reservoir in an effort to flush sediment out of Box Canyon, Last Chance, and Harriman Ranch reaches of the Henrys Fork Snake River. This sediment was released from Island Park Dam Reservoir during a severe drawdown in September 1992 which allowed head cutting of reservoir bottom sediments.

Last Chance Dredging-An interagency effort to test the feasibility of using a hydraulic suction dredge to improve near-shore overwinter habitat of juvenile rainbow trout *Oncorhynchus mykiss* was conducted on October 18-20, 1993. Agencies and groups involved included IDFG, Idaho Department of Environmental Quality (IDEQ), US Forest Service (USFS), US Bureau of Reclamation (BOR), Idaho State University (ISU), and the Henrys Fork Foundation. A custom built gasoline powered tandem dredge was used to remove sediment from sample plots of near-shore cobble habitat on the west side of the Henrys Fork at Last Chance, Idaho.

Palisades Creek Fish Screen

Pursuant to a mitigation agreement reached between the BOR, IDFG, and the Federal Energy Regulatory Commission (FERC), the BOR agreed to construct a permanent fish screening facility on Palisades Creek. This tributary to the South Fork Snake River has lost thousands of cutthroat trout *Oncorhynchus clarki* annually to a long established canal irrigation diversion. Once completed and inspected, this fish screen facility will be transferred to Region 6 for operation and maintenance responsibility.

RESULTS AND DISCUSSION

Henrys Lake

Riparian Fencing

All five riparian fencing projects (new cliffs fence, new south shoreline fence, new lower Duck Creek fence, rebuilt upper Duck Creek fence) were completed in 1993 and will be monitored and maintained with the cooperation of private and government property managers. Each project was designed specifically to minimize cattle damage to sensitive fishery habitat and recreational resources. These are ongoing projects within the Henrys Lake fishery habitat enhancement program co-sponsored by the IDFG and the Henrys Lake Foundation.

The "helixor" winter aeration system was successfully installed in late July 1993 and made operational in October 1993. This system will be evaluated through the 1993-1994 winter for operational reliability and effects on the winter dissolved oxygen profile of Henrys Lake in the vicinity of the hatchery.

Henrys Fork Snake River

Sediment Removal Efforts

Spring Flushing Flows-In March 1993, 1,200-1,400 cfs flows were released from Island Park Reservoir for approximately one week in an effort to flush sediment out of the Box Canyon, Last Chance, and Harriman Ranch reaches of the Henrys Fork Snake River. The flushing flow was considered moderately successful and resulted in removal of most main channel deposits in the Last Chance reach and somewhat less than that in the Harriman Ranch reach. Overall, a rough estimate is that 25% of the sediment deposited in the Island Park Dam to Riverside reach was mobilized and washed downstream by the flushing flow effort.

Last Chance Dredging-From 5 to 15 people at a time worked for three days in attempts to get the hydraulic dredge to remove sediment from near-shore cobble interstices while adhering to strict stream channel alteration rules (dredge wastewater had to be disposed of upland, and none was allowed to return to the wetted stream channel). Although the contractor who built the dredge was well aware of the physical conditions and discharge rules we were bound by, he assured all involved the equipment would do the job. The test was a total failure; not only did we not determine if suction dredging would improve the overwinter trout habitat, no habitat was even successfully dredged. We did learn, however, that under no arrangement or circumstance will the dredge equipment perform the job it was supposed to unless direct discharge of wastewater into the thalweg of the Henrys Fork is allowed, which is unlikely at best.

1993 ANNUAL PERFORMANCE REPORT

State of: Idaho Program: Fisheries Management F-71-R-18

Project IV: Population Management Subproject IV-G: Upper Snake Region

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

Population management activities in the Upper Snake Region are reported in other sections of this report.

Authors:

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